UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

A TWENTY-YEAR HISTORY OF FOREST INSECT AND DISEASE MANAGEMENT ON THE ALLEGHENY NATIONAL FOREST, PENNSYLVANIA, 1965-1985

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TABLE OF CONTENTS

PAGE NO.

I. INTRODUCTION..... 1

II. INSECT ACTIVITY ON THE ALLEGHENY NATIONAL FOREST, 1965-85..... 2
ASPEN LEAF BEETLE..... 2
CAMBIUM MINER ON BLACK CHERRY..... 2
CHERRY FRUIT FLY..... 2
CHERRY SCALLOP SHELL MOTH..... 2
FALL CANKERWORM..... 4
FALL WEBWORM..... 6
GREENSTRIPED MAPLEWORM..... 6
GYPSY MOTH..... 6
HALF-WINGED GEOMETER.....10
HEMLOCK LOOPER.....11
LARCH SAWFLY.....11
LINDEN LOOPER.....11
MAPLE TRUMPET SKELETONIZER.....12
OAK LEAF ROLLER, OAK LEAF TIER.....12
ORANGESTRIPED OAKWORM.....13
PINE ENGRAVER BEETLE.....13
SADDLED PROMINENT CATERPILLAR.....13
SPRUCE BUDWORM.....13
SUGAR MAPLE BORER.....13
WHITE PINE WEEVIL.....13

III. DISEASE INCIDENCE ON THE ALLEGHENY NATIONAL FOREST, 1965-85.....15
ANNOSUS ROOT ROT.....15
ASH DIEBACK.....15
BEECH BARK DISEASE.....15
BLACK KNOT OF CHERRY.....16
CHERRY LEAF SPOT.....17
DIPLODIA TIP BLIGHT.....17
WHITE PINE BLISTER RUST.....18

IV. ACKNOWLEDGEMENTS.....19

V. APPENDIX.....20
MAPS.....20
TABLES.....20

INTRODUCTION

Insect and disease pests have an important, although undesirable, role in the management and planning of our National Forests. Because they exert pressure on the timber and aesthetic components of the forest through their activity, we sometimes have to counteract them with our own control measures or management techniques.

The purpose of this report is to document the major noticeable insect and disease activities on the Allegheny National Forest for a twenty year period, from 1965 through 1985. During that time, several pest species were identified in the forest each year, but only a few were in significant enough amounts to warrant control measures being undertaken.

Aerial pest detection surveys, using fixed wing aircraft, have been used routinely throughout the years to map the extent of pest outbreaks, which can then be confirmed by subsequent ground checks. More recently, color-infrared aerial photography has been useful in mapping large-scale infestations with a great deal more accuracy. Most of the maps included in the Appendix were copies from actual aerial survey maps.

Over the past twenty years, the office with the responsibility for forest pest management on the Allegheny National Forest has changed locations, names, and of course, personnel; this will be obvious throughout the text of this report. Their major responsibilities have remained the same, however: To survey, monitor, detect, and evaluate pest problems on the Forest, and to make recommendations for their effective management to the Forest Supervisor and Timber Staff Officers. This report, then, reflects in a large part the correspondence between these offices over the past twenty years, with the original words enclosed within quotation marks.

Miscellaneous Publication No. 1426 of the U.S. Forest Service, Insects of Eastern Forests, has been used for proper nomenclature of the insects, and should be referred to for a complete description of the species involved. Hepting's Diseases of Forest and Shade Trees of the United States (Agricultural Handbook No. 386) should likewise be used for the diseases.

We have listed the more important insects and diseases alphabetically within their sections. By no means is this a complete list, as there are always some that go unnoticed or are so common they are not recognized as pests. Most, however, have had some impact on the Allegheny National Forest.

Aspen Leaf Beetle

Aspen leaf beetles (genus Chrysomela) were observed on 150 acres of aspen trees on the Ridgway District in September 1973. The trees were 90-100 percent defoliated. Control was not recommended by Forest Pest Control in Delaware, Ohio.

Cambium Miner on Black Cherry

Evidence of cambium miner (Phytobia pruni) on black cherry saplings was noted on the Allegheny National Forest in July of 1973.

It was also present "in relatively low numbers" on four tree improvement plantations on the Forest in 1976, including the Blue Jay seed orchard and tree evaluation plantations at Hemlock Run, Greeley Farm, and Twin Lakes. Forest Insect and Disease Management surveys suggested minimal economic impact from the cambium miner on black cherry.

In 1980, cambium miner was reported by Stan Myslinski on the Ridgway Ranger District and confirmed by Larry Yarger of the Delaware Field Office (9-8-80), who said it occurred in Pennsylvania before and was also reported south of Forest that year.

Cherry Fruit Fly

Maggots of the cherry fruit fly (Rhagoletis cingulata) were found on prematurely - dropped black cherry fruit in July of 1971 from black cherry orchards on the Allegheny National Forest. It was not known as to whether they were the primary causes of the premature fruit fall. Fusarium fungi were also isolated from the immature fruits.

Since the premature fruit drop had caused several years delay in the establishment of the black cherry orchards, a preventative spray program was recommended by Forest Pest Control, including the fungicide "Captan" to help control the Fusarium fungi.

Cherry Scallop Shell Moth

The cherry scallop shell moth (Hydria prunivorata) was reported on the Ridgway Ranger District in the Summer of 1971. It was again seen by Paul Brohn of the Ridgway Ranger District on August 1, 1972. He described it as a "serious outbreak", "especially serious at the Twin Lakes Recreation Area", and requested assistance from Forest Pest Control in Delaware, OH.

On August 7-8, 1972, Jim Hanson of Forest Pest Control, Delaware Field Office, visited the Bradford and Ridgway Districts, and confirmed the heavy defoliation by the cherry scallop shell moth on the Ridgway District. Only limited moderate defoliation by the cherry scallop shell moth occurred on the Bradford

Ranger District (See map no. 1). He recommended periodic observations in both districts on defoliated and undefoliated trees, as well as an aerial survey and ground check to determine insect problems along the reservoir. Larvae were also to be collected to be used for insecticide screening studies, as there was no insecticide labeled for the cherry scallop shell moth at that time. Screening was done at Berkeley, California, in 1973 and Sevin-4-oil was found to be the most effective.

The Cherry scallop shell moth moved further into the Bradford District in 1973. Heavy defoliation (35-100 percent) was confined mostly to orchard or sparsely stocked areas on approximately 5 percent of the Bradford District. Defoliation was light to moderate (10-35 percent) on 60 percent of the District, in well-stocked forest stands. On most of the northern third of the District, defoliation was light to none (15-0 percent) (See map no. 2).

In Spring of 1974, a field test was initiated to determine the effectiveness of Sevin-4-oil against cherry scallop shell moth larvae by Forest Pest Control, Delaware Field Office, using three different spraying schedules. Although two applications gave the best foliage protection, one application fourteen days after hatch allowed only a small additional amount of defoliation. It was determined to be most economical. Further testing was found to be required, as well as research on defoliation effects on cherry growth and methods for more accurate prediction of cherry scallop shell moth larval population size.

"The cherry scallop shell moth caused light to severe defoliation of black cherry in a number of scattered areas throughout the Forest", according to a 1974 aerial survey (See map no. 3). "On forest lands in Elk County where defoliation by this insect had been severe the preceding three years, the population collapsed, and only two small areas in the southern part of the district were observed from the air". "Over the entire Bradford District, cherry scallop shell moth defoliation decreased greatly in 1974 from the 1973 level. Some scallop moth defoliation occurred on approximately 80 percent of the District, ranging from 0-35 percent", with little or no defoliation in the northern twenty percent of the District.

Aerial surveys conducted in 1975 indicated that the cherry scallop shell moth population had collapsed, with only negligible defoliation and no tree mortality apparent.

Low numbers of adult moths were observed in several black cherry stands on the Forest in 1977, but no defoliation was apparent.

In 1982, the cherry scallop shell moth defoliated 6,187 acres in and around Kane, PA, according to aerial survey sketch maps from the Pennsylvania Bureau of Forestry (See map no. 4).

In 1983, a new outbreak of cherry scallop shell moth occurred on the Allegheny National Forest and was mapped in a series of two aerial detection flights of late June and July of that year. (See maps 5 - 7) The outlined areas represent acreage defoliated by the cherry scallop shell moth as recorded on July 25-26. The symbols within the outlines indicate the intensity and frequency of this defoliation and are explained as follows:

Intensity	Frequency
L = Light (1-30 percent)	S = Scattered
M = Moderate (31-60 percent)	F = Frequent
H = Heavy (61-100 percent)	

The Forest encountered a total of 27,450 acres of defoliation as a result of this insect. Of this total, the Ridgway District accounts for 24,075 acres, or 88 percent of the total; the Bradford District, 2,450 acres, or 9 percent, and the Sheffield District, 925 acres, or 3 percent. The Marienville District was not affected.

To assess the potential impact of the Cherry Scallop Shell Moth on timber, Bob Acciavatti of Forest Pest Management, Morgantown, West Virginia, examined past records taken by Bob Smith, Bradford Ranger District during the 1972-74 cherry scallop shell moth outbreak on the Allegheny National Forest.

"In 1972, Bob Smith had marked 40 black cherry trees in an orchard stand along FR 150 near Marsh Pond. For each of the three years, he noted percent defoliation." Of the original 40 trees, none had died after three years defoliation, "but 21 exhibited some degree of branch mortality", and their crowns were less vigorous.

Because it was impossible to examine the same trees, Bob Acciavatti and Leif Anderson, Bradford Ranger District located and evaluated thirty live black cherry trees near those that Bob Smith had marked, with undoubtedly the same cherry scallop shell moth defoliation history. Annual ring widths from 1973 through 1983 were measured on each tree and used to reconstruct the DBH for each year. Annual cross sectional areas were calculated, and compared with mean annual precipitation from April through July.

They concluded from their study "that cherry scallop shell moth causes neither tree mortality nor top-kill, but at most, results in some limb mortality and a slight but temporary reduction in growth increment". Therefore, they did "not recommend any management of cherry scallop shell moth based on timber considerations".

On August 15 and 16, 1984, an aerial survey was flown by Forest Pest Management, Morgantown, to determine cherry scallop shell moth defoliation on the Allegheny National Forest that year. "Defoliation estimates on the Bradford Ranger District were 12,610 acres of heavy/scattered; 350 acres of heavy/widespread. On the Ridgway Ranger District, 38,494 acres of moderate/scattered; 2,452 acres of heavy/scattered. On the Sheffield Ranger District, 3,386 acres of heavy/scattered. No cherry scallop shell moth damage was detected on the Marienville Ranger District." (See map no. 8)

Fall Cankerworm

In 1964, "a few scattered areas of light defoliation by the fall cankerworm. (Alsophila pomentaria), were detected on the Ridgway and Bradford Districts" totaling 780 acres. In 1965, "the Forest requested an evaluation of the fall cankerworm in 22 particularly valuable stands, including two recreation areas,

on the Bradford and Ridgway Districts." (This area surrounds Kane, PA) 50,000 acres were defoliated in 1965.

The State of Pennsylvania carried out a fall cankerworm control project in Spring of 1965, in Potter and Tioga counties east of the Allegheny National Forest, after three years of defoliation (1962-64). It was their largest spray project ever, (at that time) covering over 100,000 acres, using DDT insecticide at 1/2 lb./acre. (It was felt that Sevin & B.t. were not fully proven at that time.)

An egg mass survey was conducted in January 1966 as part of a biological evaluation by the Southern Insect and Disease Control Zone, Harrisonburg, Virginia. Due to limited evidence of natural controls, spraying was recommended in 13 timber stands and 2 recreation areas.

"On May 24, 1966, the Twin Lakes and Kiasutha recreation areas were sprayed with carbaryl (Sevin) at 1/2 lb./acre to minimize defoliation and make the ara appealing to its users."

In June of 1966, the Forest was flown by Forest Insect and Disease Control personnel to determine infestation boundaries and defoliation associated with the fall cankerworm and other insects. It was found that areas of heavy fall cankerworm defoliation were in the vicinity of Kane & Warren, PA; the outbreak was extending northward (See map no. 9). Calosoma beetles were reported (in a subsequent ground check that month) to be numerous in most areas of defoliation, but "did not seem to be effective in controlling the fall cankerworm population". Approximately 160,000 acres on the ANF were defoliated in 1966 by this pest.

An egg survey of this pest was conducted late in 1966 by Jim Hanson of Forest Insect and Disease Control, and it was determined that female cankerworm moths were not depositing the usual 100 + eggs each, but only twenty per female (in the laboratory). Therefore, it was recommended that suppression was not necessary in 1967, but that surveys be conducted in Spring of 1967 to monitor populations. Only 60,000 acres were defoliated in 1967.

By 1968, the insect was only present in endemic numbers, and biological evaluations were dropped. During the course of this pest's outbreak from 1964-68, the population exhibited a "north westerly movement from the east side of the Forest" (See map no. 10).

In 1975, the fall cankerworm, in association with the linden looper, defoliated approximately 67,000 acres, primarily on the Bradford District. Oak, cherry, beech, and maple were 80-100 percent defoliated by mid-June and had begun to refoliate by mid-July. In December of that year, a biological evaluation was conducted by Forest Insect and Disease Control, Delaware, Ohio, to determine the fall cankerworm population in the Forest, utilizing the female moth trapping method. It was concluded the "the Forest can expect at least the same amount of defoliation that occurred over the northern half of the Bradford District in 1975". Chemical control was mentioned as one possible action.

Aerial and ground surveys were conducted in June 1976, and determined that

178,000 acres were affected at that time, 110,000 of which had only scattered-light defoliation. "The large population of fall cankerworms present on the Bradford District appeared to have partially collapsed." The center of severe defoliation had shifted southwest into the Sheffield District. No chemical control was recommended since no tree mortality had occurred.

Sugar maple mortality was evident during ground observations of a 2,400 acre area around Sheffield, PA in June, 1977, and was attributed to climatic stress and "a combination of consecutive defoliations by the fall cankerworm-linden looper complex". "Light defoliation of cherry, maple, oak, yellow birch, and beech by the fall cankerworm-linden looper complex was observed through the southeastern portion of the forest" that year.

Fall Webworm

A specimen of the fall webworm (Hyphantria cunea) was detected on the Allegheny National Forest in August of 1971, defoliating cherry trees in a seed orchard. Numerous "nests of the fall webworm were observed scattered throughout the Forest" in 1974.

Greenstriped Mapleworm

The greenstriped mapleworm (Dryocampa rubicunda) was reported to be causing light defoliation in association with the saddled prominent caterpillar on the Bradford and Ridgway Districts in 1970-72. It was seen in 1973 in the Sheffield area (See map no. 11), and was "causing serious mortality to maples in two small areas on the Bradford District" in 1974.

Gypsy Moth

A gypsy moth (Lymantria dispar) was reported to have been found in the Hearts Content area of the Sheffield Ranger District in the summer of 1971. It was thought to have been carried on a camping trailer coming from eastern Pennsylvania.

The Allegheny National Forest apparently responded to this "sighting" by sending 10 of its personnel to eastern Pennsylvania to learn gypsy moth egg mass recognition and survey techniques in the fall of 1971.

Not until ten years later, however, were detectable levels of gypsy moth-caused tree defoliation occurring in the southeast portion of Elk County, southeast of the Forest. An egg mass detection survey conducted by Forest Pest Management and Forest personnel in the fall of 1981 indicated that gypsy moth populations were already present on the Ridgway Ranger District, in the Ridgway-Hallton area, and near the Kane Experimental Forest (See map no. 12) the incidence of egg masses was very low, however, and additional areas checked to the west yielded no egg masses. No noticeable defoliation was detected on the Forest that year.

In the Spring of 1982, twenty-five gypsy moth traps baited with the mating pheromone "Disparlure" were deployed by each Ranger District (See map no. 13) to assess the occurrence of male moth populations on the Allegheny National

Forest. They were hung on trees before June 10 in a random fashion around each District, and retrieved after August 15. Forest Pest Management personnel counted the number of male moths in each trap.

Although no noticeable defoliation was observed on the forest due to gypsy moths in 1982, hundreds of male moths were trapped on each of the Ranger Districts, as shown in Table 1. Distribution was fairly even over the whole Forest. Egg masses were seen in the fall of that year on the Ridgway District, although not in numbers large encugh to cause defoliation the following year.

A gypsy moth detection training session was conducted at the Ridgway District office by Forest Pest Management personnel on September 28, 1982, and was received with much enthusiasum by Forest personnel. Attendees included two representatives of USDA-APHIS and 1 person from private industry, in addition to District Personnel. Participants were trained in egg mass surveying in the field, as well, and it was thought that District Rangers could keep Forest Pest Management informed of egg mass buildups on their districts.

In 1983, male moth traps were again placed by District personnel around the Forest, and a total of 84,060 male moths were caught at 93 trap locations. The Ridgway and Bradford districts had the highest numbers. The data indicated "a significant increase in the number of male moths that were captured in 1982." It was suggested that a "gypsy moth component" be incorporated into the management plan for the Forest by Forest Pest Management, Morgantown Field Office.

An egg mass survey in selected areas of the Allegheny National Forest was conducted by Forest Pest Management on November 1-3, 1983, with assistance from National Forest personnel. "The survey consisted of 190 five-minute walks and 10 fixed-and variable-radius plots". Forest wide, gypsy moth populations ranged from 0 to 1,618 egg masses per acre, and averaged 135 per acre. The heaviest populations were located in the southern portions of the Marienville Ranger District, and a "building population" was suggested by the medium to large egg mass size. Moderate to heavy defoliation in the southern portions of the Marienville Ranger District and moderate defoliation in areas of the Ridgway Ranger District were therefore predicted for 1984, as well as scattered light defoliation in the Bradford and Sheffield Ranger District's. Alternative actions mentioned were: 1) no action; 2) application of chemical insecticides; and 3) application of microbial insecticides. No recommendations were made at the time, however.

In the spring of 1984, plans were being developed for gypsy moth management on the Allegheny National Forest by Forest Pest Management and Allegheny National Forest Timber Management/Wildlife Staff personnel. Organizational roles were emphasized in a joint meeting with Pennsylvania Bureau of Forestry personnel in Clearfield, Pennsylvania, on March 22, 1984, and plans for gypsy moth detection and suppression activities were shared. The State of Pennsylvania planned to spray Clear Creek State Park, just south of the Forest, and private residences within National Forest boundaries. Some national forest land would also be sprayed, if approved.

A work plan was designed by Bob Acciavatti to evaluate the susceptibility of

three forest types (Allegheny Hardwoods, Northern Hardwoods, and Oak Forests) on the Allegheny National Forest to defoliation by the gypsy moth. The evaluation began on the Ridgway District, in the summer of 1984, with a great amount of assistance from District personnel in survey planning and implementation. High altitude panoramic aerial photography was to be used from 1983-86 to monitor severe defoliation on the stands surveyed.

An aerial detection survey for gypsy moth defoliation was flown on July 20, 1984 by Forest Pest Management, Morgantown, West Virginia. "A total of 78 acres of heavy (60-100 percent) and 1,946 acres of moderate (30-59 percent) defoliation were detected" on the Marienville District. (See map no. 14) "No other districts suffered gypsy moth defoliation of a level (more than 30 percent) that was visible from the air."

A gypsy moth egg mass survey was initiated by Forest Pest Management, Morgantown, in September of 1984, concentrating on the 100 thousand acres of the Forest known to contain oak species. "Timber Management Assistants on each ranger district divided their districts into generalized areas based on timber compartments (here termed "entomological areas") in which forest conditions are similar and management actions could be prescribed." (See map no. 15) Developed recreation sites of interest were also surveyed. Egg mass counts were converted to "egg masses per acre", which were then used to predict the percentage and class of defoliation the following spring. (See Tables 2 and 3)

The results of this biological evaluation indicated that as many as 10,574 acres could experience severe (60-100 percent) defoliation, while 30,790 acres could have moderate (31-59 percent) and 65,907 acres light (0-30 percent) defoliation. Selected recreation sites also had severe to moderate potential for defoliation.

In light of this, alternative actions were proposed to deal with the current gypsy moth outbreak, including: 1) no action; 2) treatment with a chemical insecticide (growth regulator) Dimilin, or 3) treatment with the microbial insecticide Bacillus thuringiensis (B. t.). A letter was written to the Regional Forester, R-9, requesting funds for a suppression project the following spring, on as many as 16,000 acres, using both B.t. and Dimilin. No treatment was recommended for the Ridgway District, due to low egg mass counts in fall of 1984.

From December 1984 through January 1985, the Forest worked on an Environmental Assessment of the proposed project, soliciting public comment and preparing economic analyses of the proposed alternatives. Meanwhile, Forest Pest Management and Ranger Districts were "refining" spray block boundaries and delineating them on maps and 1980 series aerial photographs of the Forest.

In March a work plan was prepared by Bob Acciavatti of Forest Pest Management and by April the Forest decided to choose "alternative 4". This called for "aerial application of B. t. on 1,049 acres of recreation areas around the Allegheny Reservoir and at Loleta Campground, aerial application of B. t. to 437 acres of timber in the Tubbs Run Watershed, and aerial application of diflubenzuron (Dimilin) to 8,991 acres of timber stands in Forest and Warren counties. A total of 10,477 acres would be treated." This alternative was

designed to "reduce the nuisance of gypsy moth larvae at developed recreation sites and protect high value oak stands at risk of mortality from gypsy moth defoliation."

On May 3rd, 1985, the Forest granted permission to the Pennsylvania Bureau of Forestry, Forest Pest Management, "to spray 571 acres on the Allegheny National Forest as buffer zones to protect private properties being sprayed" in their program. Meanwhile, a request was made by a Pennsylvania resident for a "stay" on the spray project, but it was denied by the Regional Forester on May 9th.

Final approval for the 1985 suppression project was granted by the Regional Forester, and the contract was awarded to the lowest (approved) bidder.

A total of 10,477 acres was aerially treated using 66 spray blocks (See map no. 16). "Bacillus thuringiensis or B.t., formulated as Dipel 8L, was applied to 1,486 acres at a rate of 20 BIU in 1 gallon of mix per acre. The sticker Plyac was mixed with B.t. at the rate of 2 percent of total volume. Diflubenzuron, formulated as Dimilin 25W, was applied to 8,991 acres at a rate of 1/2 ounce active ingredient in 1 gallon of mix per acre. Spraying was done between May 16 and 21, 1985, using two helicopters, a Bell 204B, and Bell 206B. Cost of material and application was $12.31/ac for the Dipel 8L spraying and $7.75/ac for Dimilin 25W." The total cost of the entire project was $171,869.

"Based on foliage protection, excellent gypsy moth suppression was achieved with each spray material. Diflubenzuron provided virtually total foliage protection within its spray blocks and only 1.4 percent of the B.t. spray acreage experienced moderate (30-60 percent) defoliation. This was determined from an aerial detection survey of June 28, 1985, and interpretation of color-infrared aerial photography flown on July 19, 1985. A total of 9,642 acres was defoliated" (See map no. 17 and Table no. 4).

"Defoliation during 1985 was less than had been anticipated from 1984 egg mass surveys. It was believed this reduction was due to a very poor egg hatch, probably as a result of a milder-than-normal December followed by a colder-than-normal January and February. An evaluation of gypsy moth egg hatch conducted on May 23 and 24, 1985 by Forest Pest Management at 35 sites scattered throughout the oak type showed that 26 percent of the egg masses produced only a few larvae (<10 percent hatch) and 37 percent of the egg masses produced less than normal number of larvae (10-90 percent hatch). These low numbers of hatching larvae, which are very atypical of the first or even the second year of a building gypsy moth outbreak could account for the failure of defoliation to develop in 1985 as predicted."

A gypsy moth egg mass survey was conducted from early September through early October of 1985, again concentrating in the 107 thousand acres known to have the oak species on the Forest. Defoliation potential was determined and estimated to be as much as 53 percent of the 107 thousand acres in the moderate to severe category (See map no. 18). Suppression was again recommended for 1986 on high use recreation sites and high value timber.

In a follow-up evaluation of the 1985 suppression project results, "an assessment of treatment effects on gypsy moth populations was made using egg

mass density changes between the treated and next generation. Within the B.t. treated spray blocks, populations increased by 58 percent compared with a 330 percent increase in densities in adjacent unsprayed areas. Since foliage protection was achieved within the B.t. blocks, adequate population reduction must have occurred within the generation treated. However, the resurgent gypsy moth populations found in the spray blocks after the egg laying period must have come from late-instar larvae migrating from the eruptive populations nearby the relatively small spray blocks."

"Diflubenzuron had provided more effective suppression of gypsy moth populations by reducing them an average of 86 percent within spray blocks compared to a 7 percent increase in adjacent unsprayed areas."

The biological evaluation of Fall 1985 had indicated the outbreak of gypsy moths would be concentrated on the Bradford Ranger District during 1986, so areas at risk there were designated, including the Tracy Ridge National Recreation Area and timber stands east of it. Potential spray blocks were tentatively drawn up, covering approximately 25,000 acres, with an estimate of $12.30/acre cost. Several alternatives were again being prepared by the Supervisor's Office in Warren (See maps no. 19 - 23).

Meanwhile, the State of Pennsylvania was again planning in 1986 to spray some National Forest land with B.t., as a buffer zone to private properties. Three of the tracts were on the Sheffield Ranger District, while five were on the Marienville Ranger District, covering a total of 261 acres.

In February 1986, the Forest was informed that funding would not be available for a 1986 gypsy moth suppression project on the Allegheny Nationl Forest "because of budget restrictions and national priorities", so all plans to that effect were cancelled.

Since 4,083 acres of managed oak timber on the Bradford Ranger District were to have been sprayed for the gypsy moth in 1986, it was thought that some silvicultural manipulation of the stands, or changes in timber sale administration, might reduce losses due to the gypsy moth outbreak. These options were presented by Forest Pest Management at the Bradford Ranger District on March 12, 1986, and included postponing thinning operations, "speeding up" some harvesting plans, and changing cutting practices.

Forest Pest Management plans to continue monitoring the gypsy moth on the Allegheny in 1986, through ground surveys, aerial surveys, and aerial photography. Plans for parasitoid evaluations are also being made.

Half-winged Geometer

The half-winged geometer (Phigalea titea) caused some of the defoliation in the Bradford District in 1975, in association with fall cankerworm and linden looper.

Hemlock Looper

"Larva of the hemlock looper (Lambdina fiscellaria) were observed and collected in Highland Township, Elk County, on the Ridgway District", in 1974. "This insect had caused serious defoliation and mortality to hemlock trees in counties south and west of the Forest" that year.

Larch Sawfly

"In July 1966 two infestations of the larch sawfly (Pristiphora erichsonii) were detected by Forest personnel on the Ridgway District... The sawfly caused an estimated 70-80 percent defoliation of [Japanese] larch stands in the summer of 1966."

In the Fall of 1966 and Spring of 1967 biological data was collected utilizing cocoon counts in one square foot duff samples to determine the effects of small mammals on the sawfly population. This was done at the Hoffman Farm and Wetmore plantations, Ridgway District; a total of 64 acres were involved. (See map no. 24)

Suppression was recommended for 1967, in the form of 1/2 lb. malathion/acre to protect the stands from severe defoliation, since parasitism and predatory control was minimal. This recommendation was carried out through aerial spraying in the summer of 1967, using LV malathion at 13 oz./acre.

A report dated 7/9/68 stated that scattered trees outside the two larch plantations had not been sprayed in 1967, and it speculated another bad infestation in a couple of years. In 1969, defoliation was reported as moderate in both plantations.

A later evaluation in June of 1970 reported damage on the Ridgway Ranger District to be "light to moderate, except for 55 acres at the Old Wetmore Coal Recovery Plantation, which is moderate to heavy." No suppression treatments were recommeded, however, "due to the high cost involved".

The larch sawfly was again reported on the Ridgway District on July 7, 1972, but was only causing minimal damage.

Linden Looper

The Linden looper (Erannis tiliaria) was seen causing defoliation southwest of Kane on the Forest in 1967. (See map no. 25)

In association with the fall cankerworm, linden looper defoliated approximately 67,000 acres, primarily on the Bradford District in 1975. (See Fall Cankerworm)

Linden looper was also part of the complex to which mortality of sugar maple was attributed to on 2,400 acres around Sheffield, PA in 1977, and caused light defoliation through the southeast portion of the Forest that year.

Maple Trumpet Skeletonizer

Throughout the Ridgway District, a moderate infestation of the maple trumpet skeletonizer (Epinotia aceriella) was noticed in August of 1970. The insects were feeding on both sugar and red maple, but were not causing serious damage. They were again reported on the Ridgway District in the Summer of 1971.

Oak Leaf Roller, Oak Leaf Tier

"The oak leaf tier, Croesia semipurpurana, greatly increased its infested area in 1966. Heavy defoliation was found along the Allegheny River Reservoir and northwest of the National Forest boundary. The defoliation seemed to follow the major drainage patterns and was selective to scarlet oak, black oak, and northern red oak." This excerpt from a 1966 Aerial Detection Survey Report by Insect & Disease Control, sums up the oak leaf tier situation in 1966.

Medium to heavy defoliation by the oak leaf tier was reported around the Allegheny Reservoir in 1972 as being "heavier and more noticeable this year than last year" by Bradford District Ranger James Hooper. (See map no. 26)

In 1973, heavy defoliation by the oak leaf tier and oak leaf roller was reported between Tionesta and Kelletville by the State of Pennsylvania. (See map no. 27)

Throughout 1974, the oak leaf tier continued to be a major forest pest, when, in association with the oak leaf roller (Archips semiferanus), they infested approximately 63,000 acres of National Forest land. There were primarily three areas of concentration on the western side of the Forest: the largest was in Forest County, between Tionesta and Kellettville. (See map no. 28) The other two were in Warren County, east of Tidioute and west of Hearts Content, respectively. "The ground and aerial surveys conducted by Forest personnel showed oak mortality occurring in some of the high population areas."
Forest Insect and Disease Control, of Delaware, Ohio, recommended three possible alternatives for action. 1) Accelerated cutting - salvage; 2) chemical control; or 3) no action.

1975 correspondence indicates that the Forest was interested in "degrade associated with mortality following oak leaf roller defoliation on 60,000 acres of the Sheffield & Marienville Districts. Defoliation varied from negligible to light that year.

In June of 1977, oak mortality averaging 20+ trees per acre was observed on 12,000 acres in the western portion of the Forest during an aerial survey by Forest Pest Management. This mortality was ascribed to oak leaf roller infestations of 1973-74.

In 1982, "defoliation by oak leaf rollers and leaf tiers was the most serious damage observed" during a June aerial survey of the Forest, occurring on about 21,040 acres, This was "an intensification and spread of the defoliation" reported in the previous year by Porter Gearhart, Timber Management, which stripped scattered oak trees "on the Allegheny River slopes between Tidioute and Buckaloons". (See map no. 29)

Orangestriped Oakworm

The orangestriped oakworm (Anisota senatoria) was noticed in Elk county on the Ridgway District in October of 1970. No damage was attributed to it.

Pine Engraver Beetle

Pine engraver beetles (Ips pini) were noted to have attacked a few red pines in the Beaver Meadows Campground (Campsite No. 36) which had been struck by lightning in 1984. Bob Acciavatti of Forest Pest Management was alerted to this by Alan Ward of the Marienville Ranger District in May 1985, who had noticed numerous red pines with dead crowns. There was no evidence of an outbreak of the pine engraver, only a slight amount of activity from insects already native to the area.

Recommendations were made by Forest Pest Management to remove dead trees for safety and aesthetic reasons, but not because of any threat to surrounding red pines. "A minimal chance of future red pine mortality at Beaver Meadows Campground was indicated".

Saddled Prominent Caterpillar

The saddled prominent caterpillar (Heterocampa guttivitta) caused light defoliation, 1970-72, on the Bradford Ranger District in association with the orangehumped mapleworm (Symmerista leucitys) and greenstriped mapleworm. (See map no. 30) It also caused very light defoliation on the Ridgway district in 1970, in conjunction with the greenstriped mapleworm.

Spruce Budworm

"Large numbers of adult moths of the spruce budworm (Choristoneura fumiferana) showed up in late July (1974) throughout the Forest. These moths reportedly rode down from Canada on a cold front." Although no damage was reported on the Forest that year, "the spruce budworm caused severe defoliation on hemlock in several areas to the southeast of the Forest."

Sugar Maple Borer

The sugar maple borer (Glycobius speciosus) causes defects in wood through mining in the sapwood by its larval stage. In 1977, a survey was undertaken by Forest Insect and Disease Management of Delaware, Ohio to evaluate a survey method for standing sugar maple trees. This survey showed where the sugar maple borer populations are concentrated, and which diameter classes of trees are most affected. The results indicated that trees of 14.0 to 16.9 inch diameter class had the highest amount of infestation, at 26.0 percent.

White Pine Weevil

In 1964, a limited survey by Insect and Disease Control indicated that 3-4 percent of the trees in the 38-acre Owl's Nest white pine plantation (P-23) on the Ridgway District were under attack by the white pine weevil (Pissodes strobi). In 1965, the situation got worse, and only 95 percent of the trees

were not infested. A suppression project was recommended if the Forest wanted to attain their goals of 18' high attack-free trees in 10 years. This consisted of treating the individual leaders with a 2 percent DDT emulsion using portable compressed-air sprayers at two year intervals for ten years. Combined with pruning damaged leaders of already infested trees and releasing the white pines from overstory hardwoods, it was thought that the trees could resist future attacks and recover from previous ones, thereby accomplishing the Forests' goals. Permanent plots would also be established to obtain data on post suppression results.

(It is not known if this project was implemented.)

White pine weevil activity was also noticed on the Ridgway Ranger District in 1971.

DISEASE INCIDENCE ON THE ALLEGHENY NATIONAL FOREST 1965-1985

Annosus Root Rot

In May of 1968, a ground survey for Fomes annosus was conducted by Delaware Field Office personnel on red pine plantations on the Allegheny National Forest thinned prior to 1967. These covered 3500 acres. No evidence of infection was found. (NOTE: F. annosus is now known as Heterobasidion annosum.)

Ash Dieback

This disease was observed on the Bradford Ranger District in early 1965 in the "coon run sale" area. Ash was not the major component of the stand, but appeared to be the only species affected. Roughly 90 to 130 acres were affected, and the District Ranger wanted to request permission for the sale in January of 1966 before the dieback spread. The break down was as follows: Forty to eighty acres moderate dieback; approximately 40 acres of light dieback; and approximately 10 acres of heavy dieback.

In December 1965 T. Craig Weidensaul, of Southern Zone Forest Insect and Disease control designed a working plan for evaluation of the rate of decline of white ash on the Allegheny National Forest. He measured 200 trees to determine DBH, tree age, dieback class, and appearance of leaves, twigs & stems. Similar data was again collected on 50 of these trees in 1967, on 195 of these trees in 1968, and on 147 trees in 1971 by William Lautz of the Delaware, Ohio Forest Pest Management field office.

Lautz concluded that ash trees with slightly less than 50 percent of their crown dead would die in about 15 years, and those with over 50 percent dead crown area would die in three to five years under similar conditions. This information was to be useful in selecting trees for salvage cuttings.

Beech Bark Disease

Beech bark disease, caused by the fungus Nectria coccinea var. faginata was first reported on the Bradford Ranger District in the spring of 1985 by Manfred Mielke of Forest Pest Management. The fungus was vectored by the beech scale insect, Cryptococcus fagisuga, which was known to have preceded the disease in this area by a few years.

"Areas of beech mortality were observed on the northern portions of the Bradford Ranger District.... during aerial sketch mapping in June 1985" by Forest Pest Management. "The causal agents of this damage were verified on the ground specifically as the beech bark scale, symptomatic 'tarry spots' caused by the Nectria fungus, and the fungus itself."

In the summer of 1985 an evaluation was initiated by Bob Acciavatti, Forest Pest Management, Morgantown, to "determine the amount and location of beech bark disease damage over 17,780 acres within 21 compartments of the Bradford Ranger District where disease damage has been observed". Compartment/stand data for beech were obtained using the TIMIS Data Base at Fort Collins

Computer Center by Porter Gearhart, Timber Management, and maps of the beech compartments and stands were obtained from the Bradford Ranger District. Photointerpretation of color infrared aerial photography of the Bradford Ranger District flown in mid-July 1985 was conducted to determine intensity and frequency of the damage within each stand and compartment (See map no. 31). On the ground, verification of the disease as the causal agent for tree mortality was also made for several stands.

Beech bark disease damage was generally light on 87.6 percent of the 17,780 acres surveyed with aerial photography because most stands in the survey area contained <10 percent American beech stocking. Stands where dead and dying beech trees comprised 10-25 percent of the stocking occurred in about 12.3 percent of the survey acreage, whereas stands with >25 percent beech mortality occurred in <0.1 percent of the survey area.

"Currently, beech bark disease occurs over much of the Bradford Ranger District north and east of Pennsylvania State Highway 321". It was also "confirmed as the cause of recent beech mortality at Hearts Content Natural Area on the Sheffield Ranger District" in December 1985 by Manfred Mielke.

A training session was held at the Bradford Ranger District on December 10, 1985, involving disease recognition and timber impacts. The Northeast Forest Experiment Station and Forest Pest Management jointly hosted the meeting. Limited silvicultural management options suggested by Forest Pest Management included sanitation cuttings where the disease is not too well established, and salvage of dead and dying beech for those stands with moderate to severe mortality.

In 1986, Forest Pest Management plans to continue the beech bark disease damage survey using new aerial photography and additional newly-inventoried compartments as they become available.

Black Knot of Cherry

In 1975 Black Knot (Apiosporina morbosa) was observed on black cherry in "alarming" amounts by a forester from the Sheffield Ranger District, while making stocking surveys on regeneration areas. The supervisor's office asked Forest Insect & Disease Management, Delaware, Ohio to organize a study of the situation on the Forest, since black cherry is one of the highest valued timber species on the Allegheny National Forest.

On March 20, 1975, Leon LaMadeleine, Delaware Field Office, and Porter Gearhart, Allegheny National Forest conducted preliminary examination of Black Cherry stands on the Sheffield District, observing black knot damage on the main stems of "all sized trees, from mature trees to seedlings". A survey was then planned for the fall of that year to determine the percent of cherry trees infected, the areas of highest incidence, and the relative position of defects on individual trees.

This survey was conducted by Forest Insect & Disease Management in November 1975. Merchantable black cherry stands and black cherry "regeneration areas" were randomly selected from computer printouts of the Forest. A five percent

strip cruise was made in each timber stand, and five one-milacre plots were established in each regeneration stand. (See map no. 32)

The results indicated that "black knot is widespread over the entire Allegheny National Forest, however, in general, the incidence on merchantable black cherry surveyed is low with little black knot on the main stem". (See Table 5) Black knot was most prevalent on merchantable stands on the Bradford Ranger District, and least prevalent on the Ridgway and Marienville Ranger Districts. "Only the Sheffield and Bradford Ranger Districts had any black knot on the main stem."

"The Bradford Ranger District had the lowest incidence of black knot in the regeneration areas surveyed," (See Table 6), and "all regeneration areas surveyed had very little black knot on the main stem.

In light of the survey, black knot was not considered to be a problem in either the regeneration or merchantable timber areas surveyed on the Allegheny National Forest. Three recommendations were made, however, for black knot management on the Forest: 1) plots established in regeneration areas should be reexamined periodically to determine the impact of black knot on black cherry regeneration on the Forest; 2) black knot infected trees should be removed during timber stand improvement cuttings; and 3) "black knot incidence should be noted during compartment examinations so that abnormal situations can be monitored".

Cherry Leaf Spot

Cherry leaf spot is a "serious obstacle to the regeneration of Black Cherry on the Forest, causing dwarfing, reduced height growth and possibly death. Collections of cherry seedling leaves showing severe "spotting" were made on the Allegheny National Forest in 1965, and examined under the microscope by D. S. Welch.

The causal agent of infection appeared to be the fungus. Cercospora graphiodes, not Coccomyces lutescens as expected. Control by spraying is well worked out for Coccomyces sp. on cultivated cherry, but not for Cercospora sp. However, he recommends spraying "Maneb" or "Nabam" early in the day, since the fungus germinates under moist conditions and penetrates the leaf tissue only through the stomata, which close as the day advances.

In the Spring of 1985, a study was initiated by Manfred Mielke, Forest Pest Management, Morgantown, to test the fungicide "Benelate" on the Cherry leaf spot disease occurring on black cherry seedlings in a regeneration area on the Sheffield District.

Diplodia Tip Blight

"Diplodia tip blight", caused by the fungus Diplodia pinea, was noticed during a 1983 aerial survey conducted by Forest Pest Management to be present in a 30 acre red pine plantation 8-10 years old south of Wetmore, Pennsylvania, in the Ridgway District. This was confirmed by an earlier ground check by Manfred Mielke of Forest Pest Management and Stan Myslinski of the Ridgway Ranger

District in June of that year, "with virtually all saplings less than six feet tall showing lateral and the terminal branch tip dieback. Saplings less than four feet tall were dead and those greater than six feet tall exhibited damage to a lesser degree."

Three alternative actions were proposed to deal with the situation: 1) no action, which would result in further decline of the stand; 2) application of a fungicide during the period of peak spore dispersal to prevent future infections for a limited period of time; and/or 3) physical control, by destruction and burning of severely infected trees, to reduce inoculum to below damaging levels. Alternative 1 was (apparently) the choice of the Forest.

White Pine Blister Rust

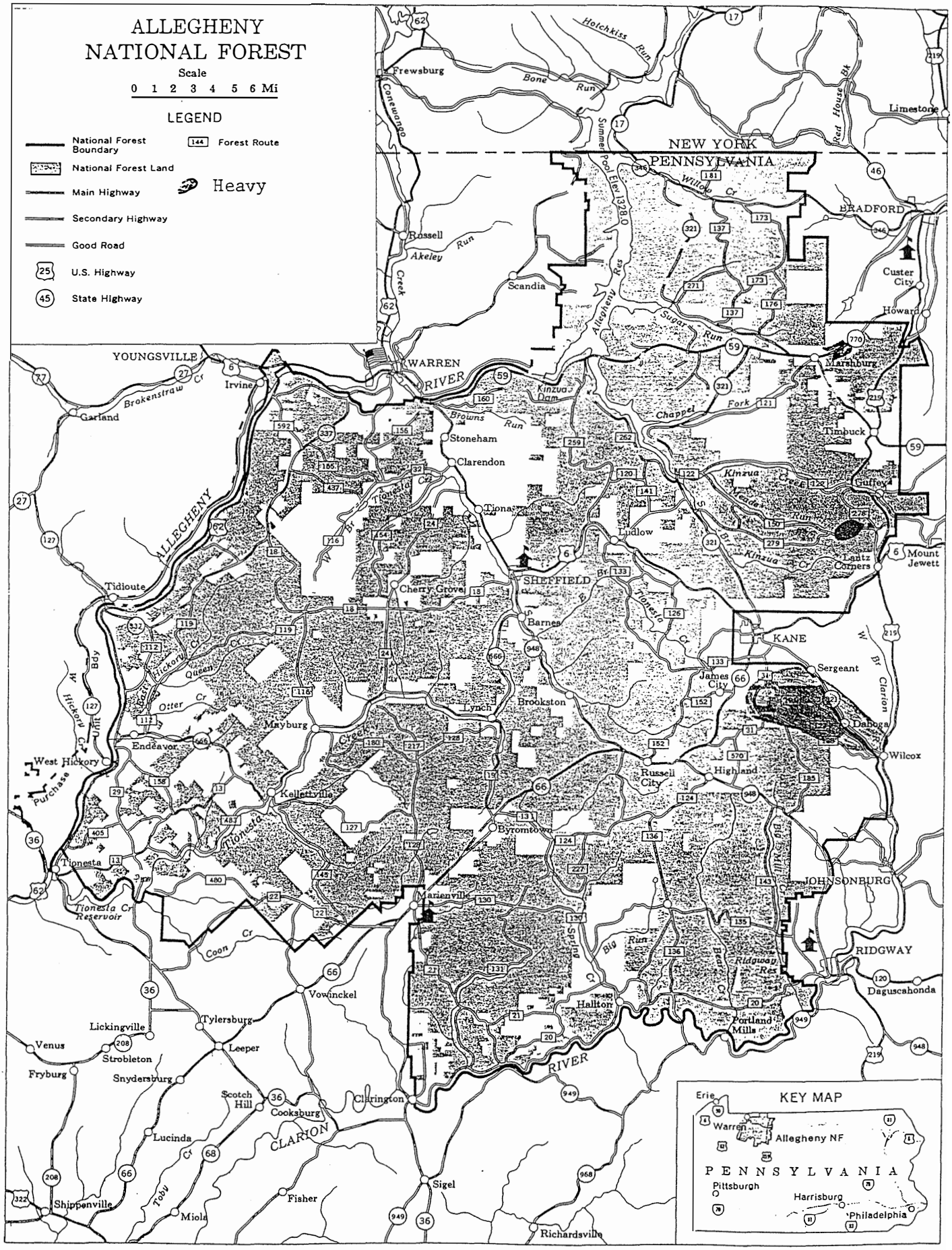
Control work on white pine blister rust, caused by the fungus Cronartium ribicola, was started on the Allegheny National Forest in 1929. As recently as 1969-71, white pine blister rust control areas were being revisited by Forest and State & Private Forestry personnel, as part of a monitoring program for the disease. Twenty-eight permanent "control areas" are shown on map no 33.

ACKNOWLEDGEMENTS

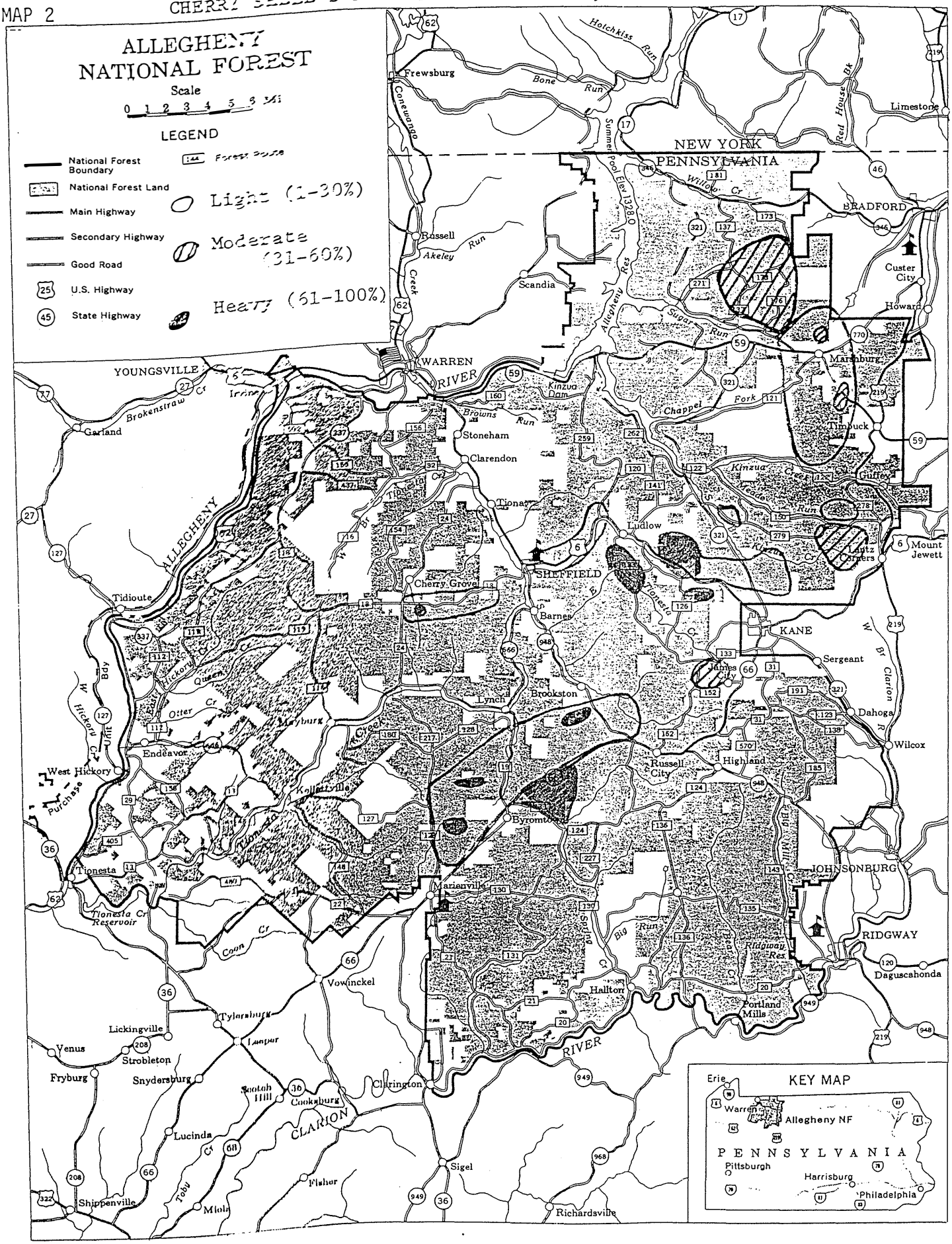
We wish to thank Porter Gearhart, Timber Staff Officer, Allegheny National Forest, for his assistance in obtaining maps and other information pertinent to this report. In addition, he and personnel from each of the four Ranger Districts have been invaluable in early detection and monitoring of the various insect & disease pests over the years, as well as implementing specific control measures directed against them. There can be little doubt that the best protection the Allegheny National Forest has from its natural "enemies" is knowledgeable and enthusiastic local field personnel.

APPENDIX

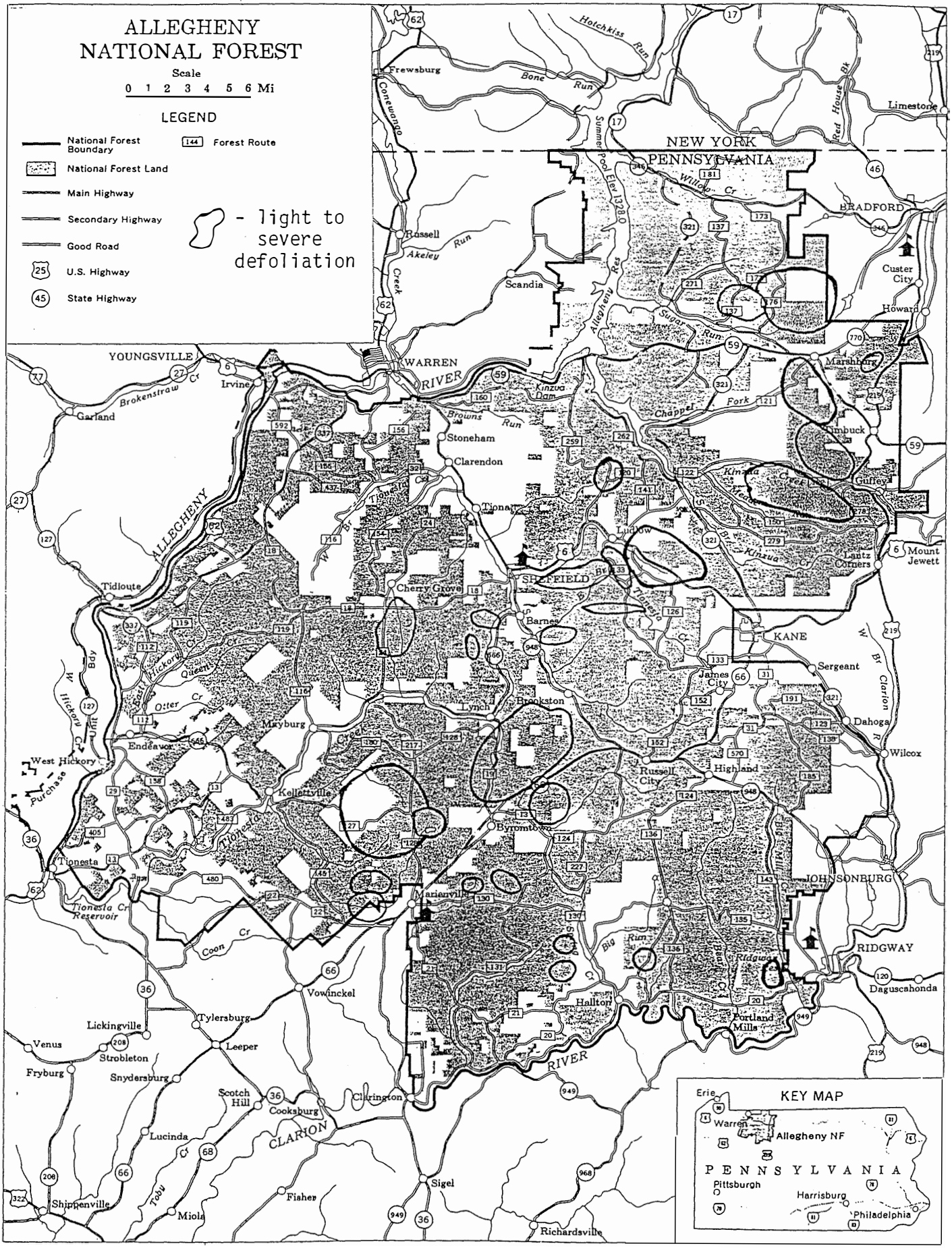
MAP 1 DEFOLIATION BY THE CHERRY SCALLOP SHELL MOTH, 1972



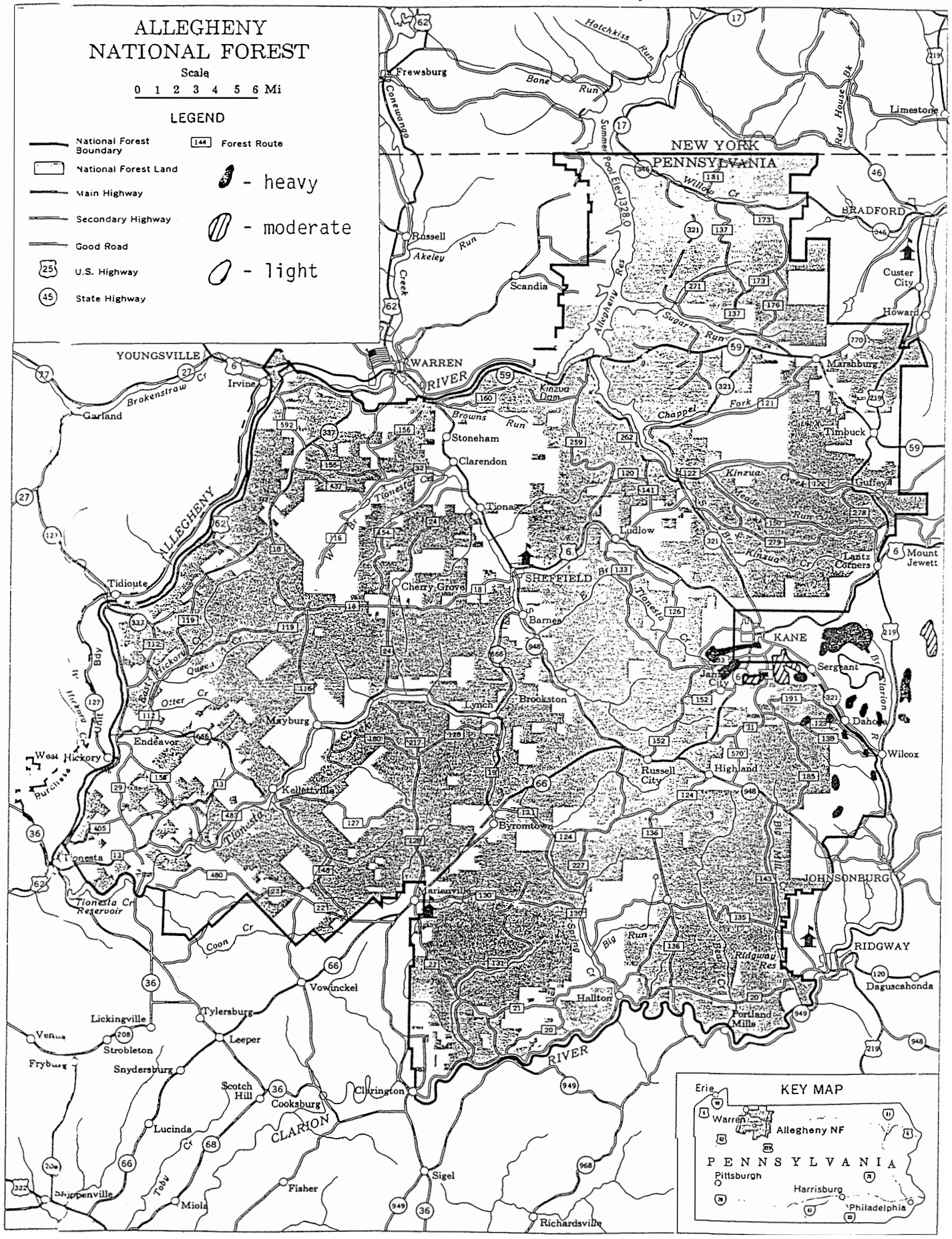
MAP 2 CHERRY SEELL SCALLOP MOTH DEFOLIATION, 1973 (APPROXIMATE)

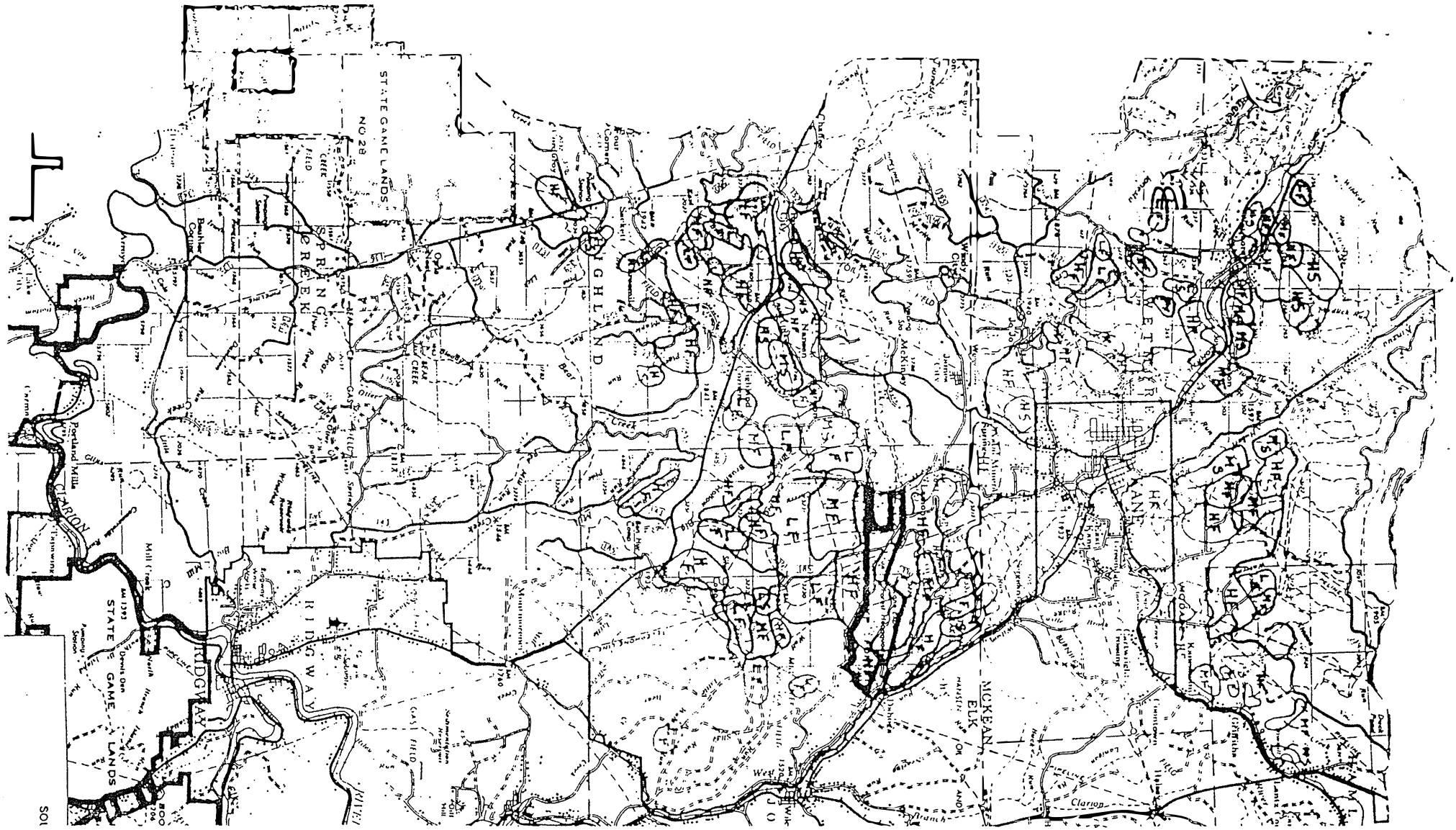


MAP 3 CHERRY SCALLOP SHELL MOTH DEFOLIATION, 1974 (APPROXIMATE)



MAP 4 CHERRY SCALLOP SHELL MOTH DEFOLIATION, 1982

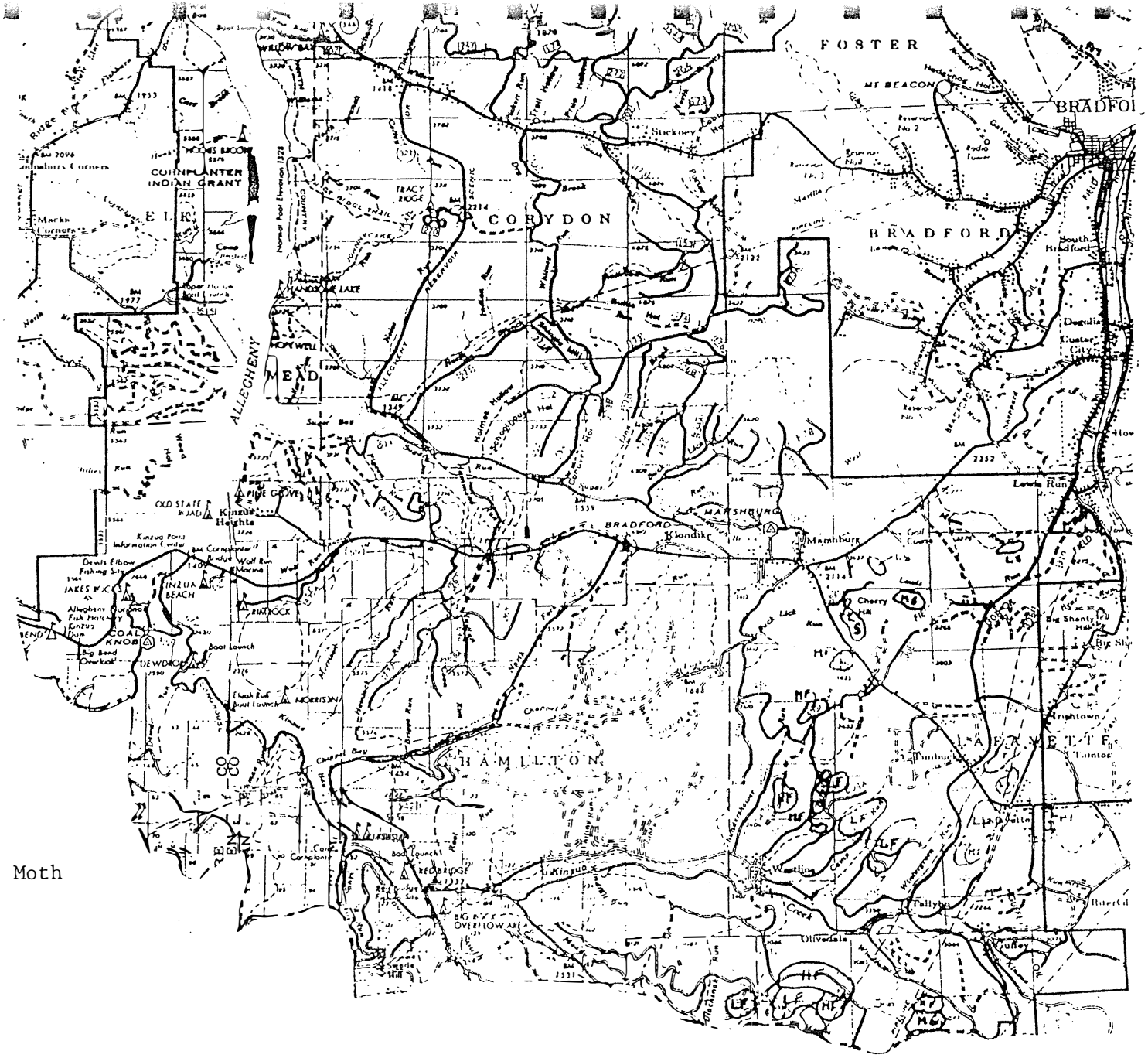




MAP 5 1983 Cherry Scallop Shell Moth Defoliation
July 25-26

Ridgway Ranger District

LS = 650 acres	MF = 3,425 acres
LF = 4,450 acres	HS = 1,525 acres
MS = 1,575 acres	HF = 12,450 acres

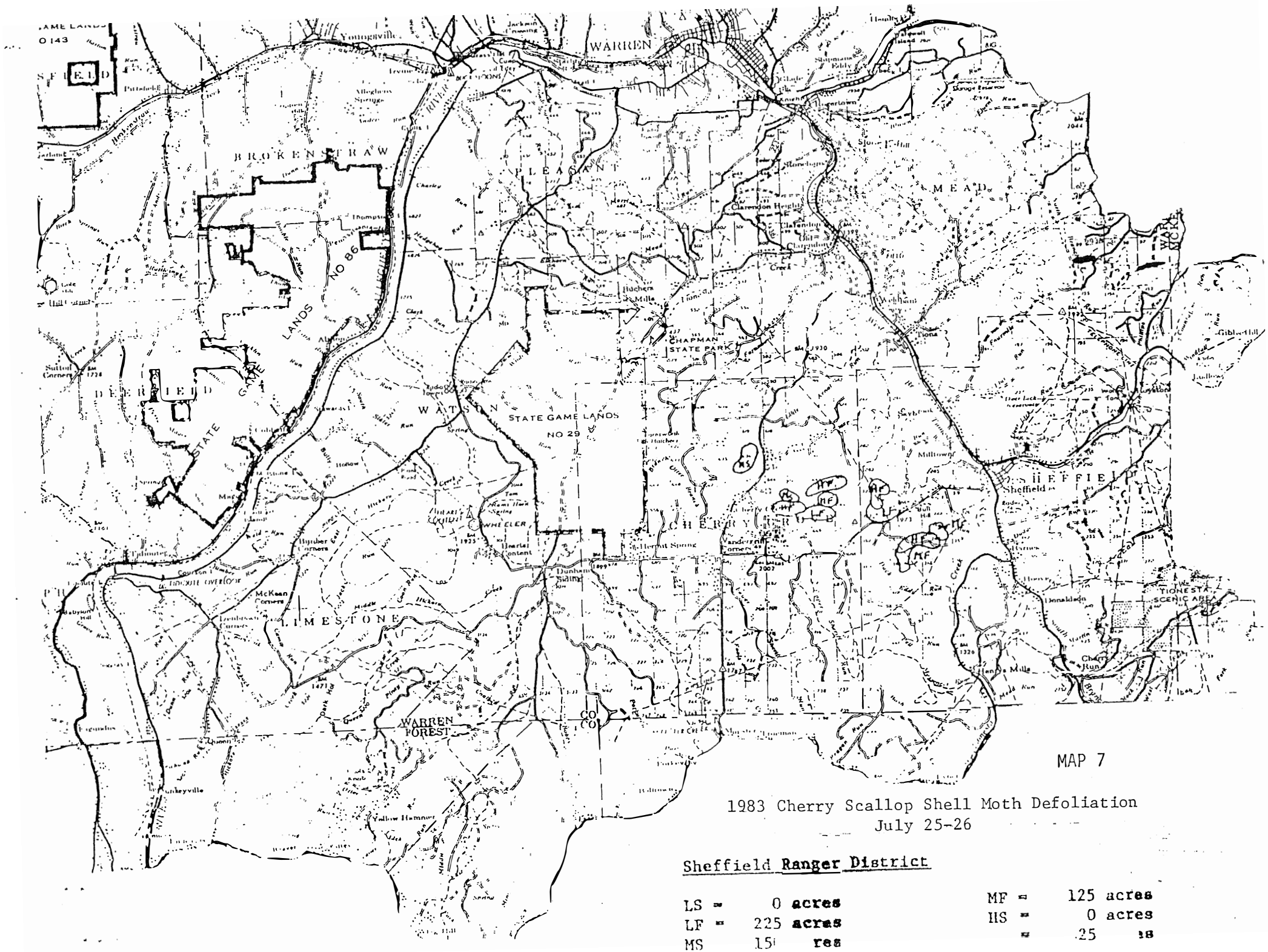


MAP 6

1983 Cherry Scallop Shell Moth
Defoliation
July 25-26

Bradford Ranger District

LS =	125 acres	MF =	300 acres
LF =	1,100 acres	HS =	0 acres
MS =	125 acres	HF =	800 acres



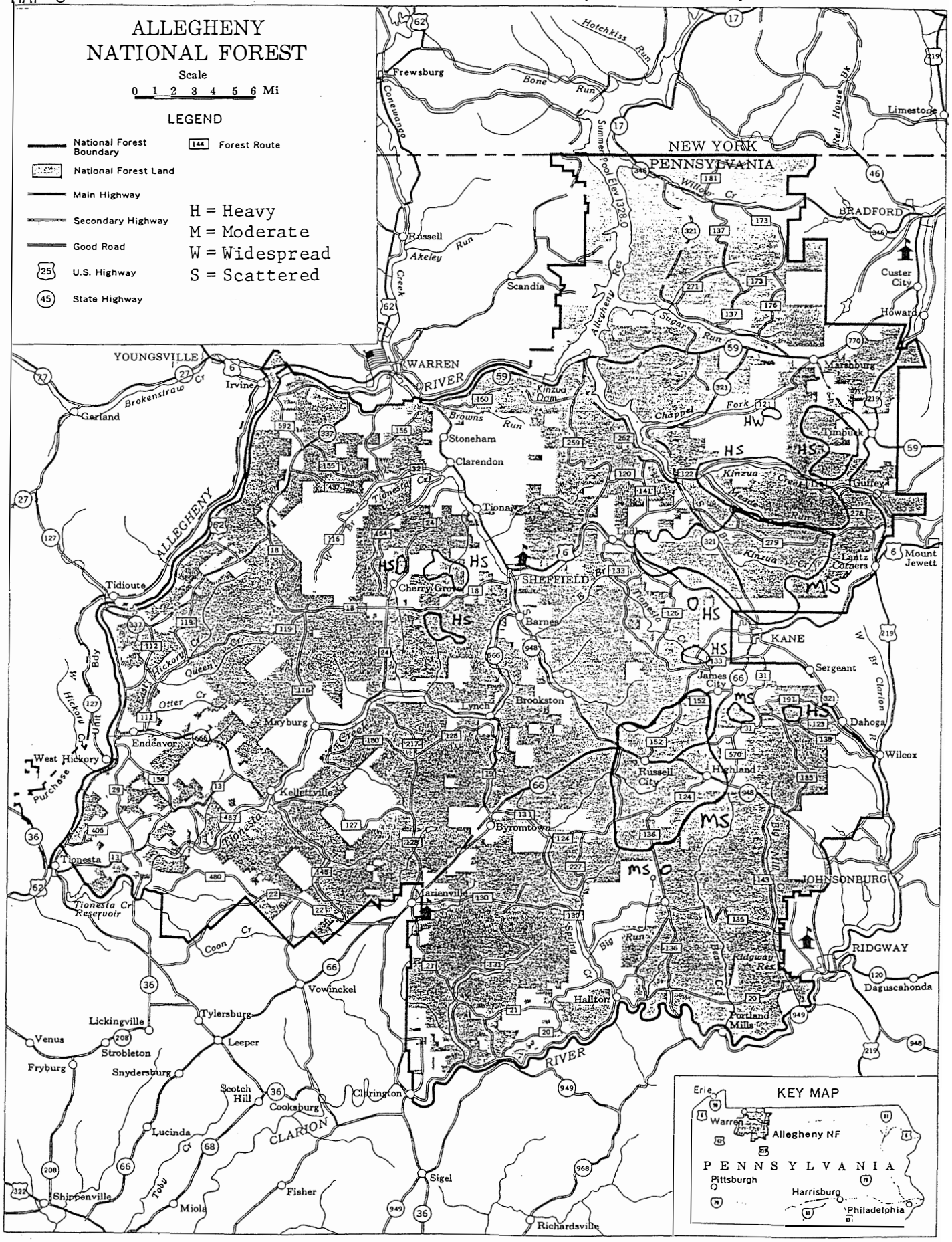
MAP 7

1983 Cherry Scallop Shell Moth Defoliation
July 25-26

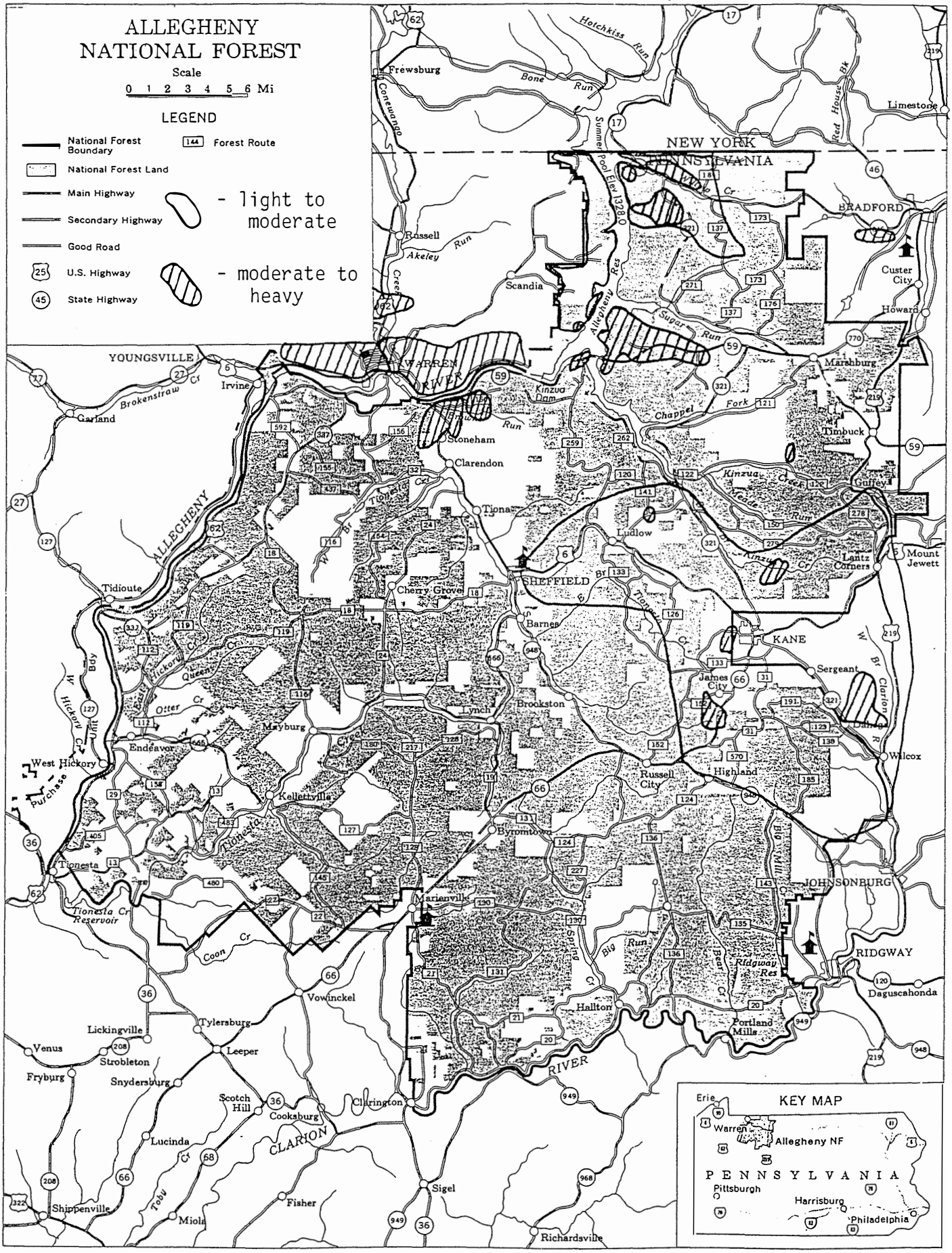
Sheffield Ranger District

LS =	0 acres	MF =	125 acres
LF =	225 acres	HS =	0 acres
MS	15 res	=	25 as

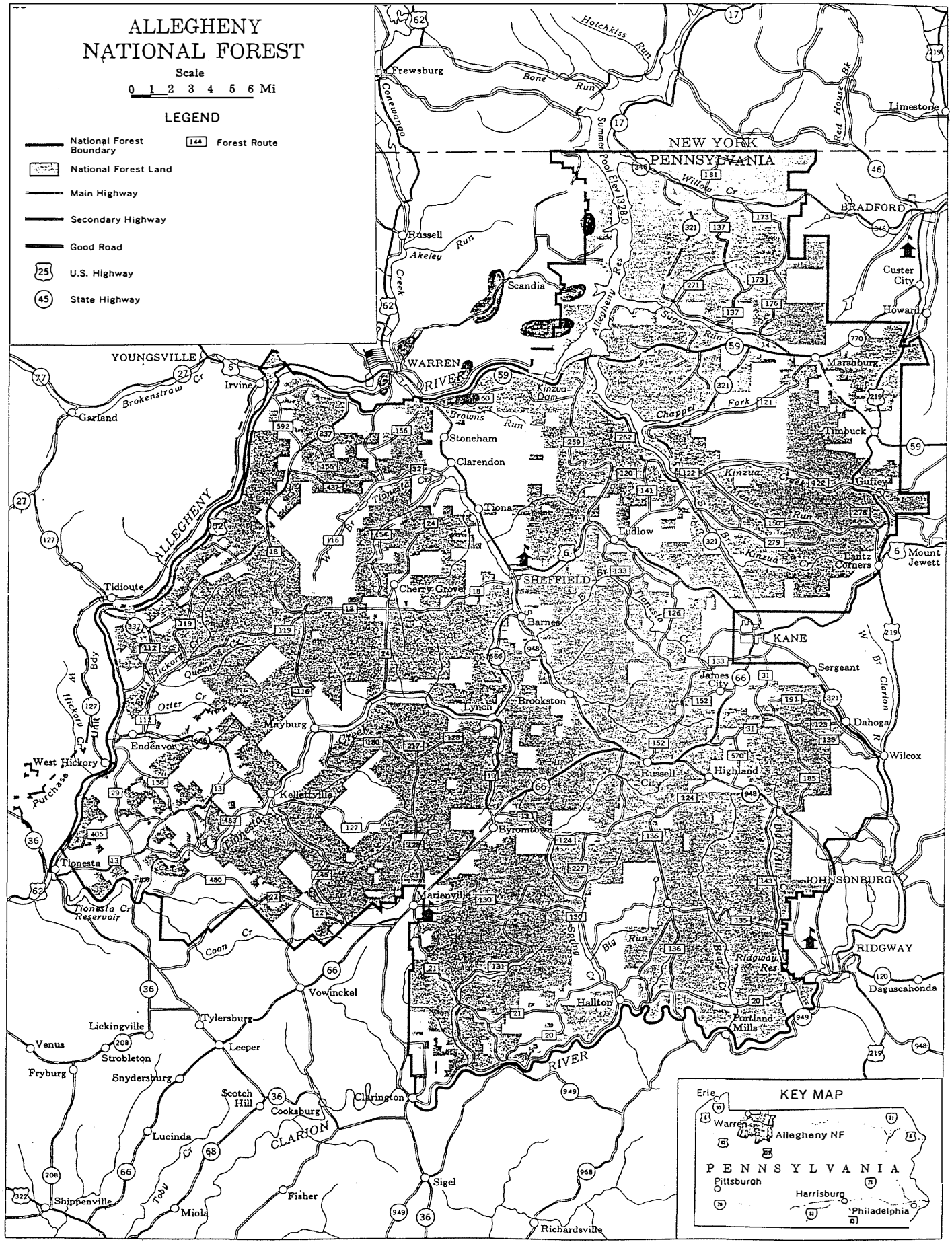
MAP 8 CHERRY SCALLOP SHELL MOTH DEFOLIATION, AUGUST 15-16, 1984



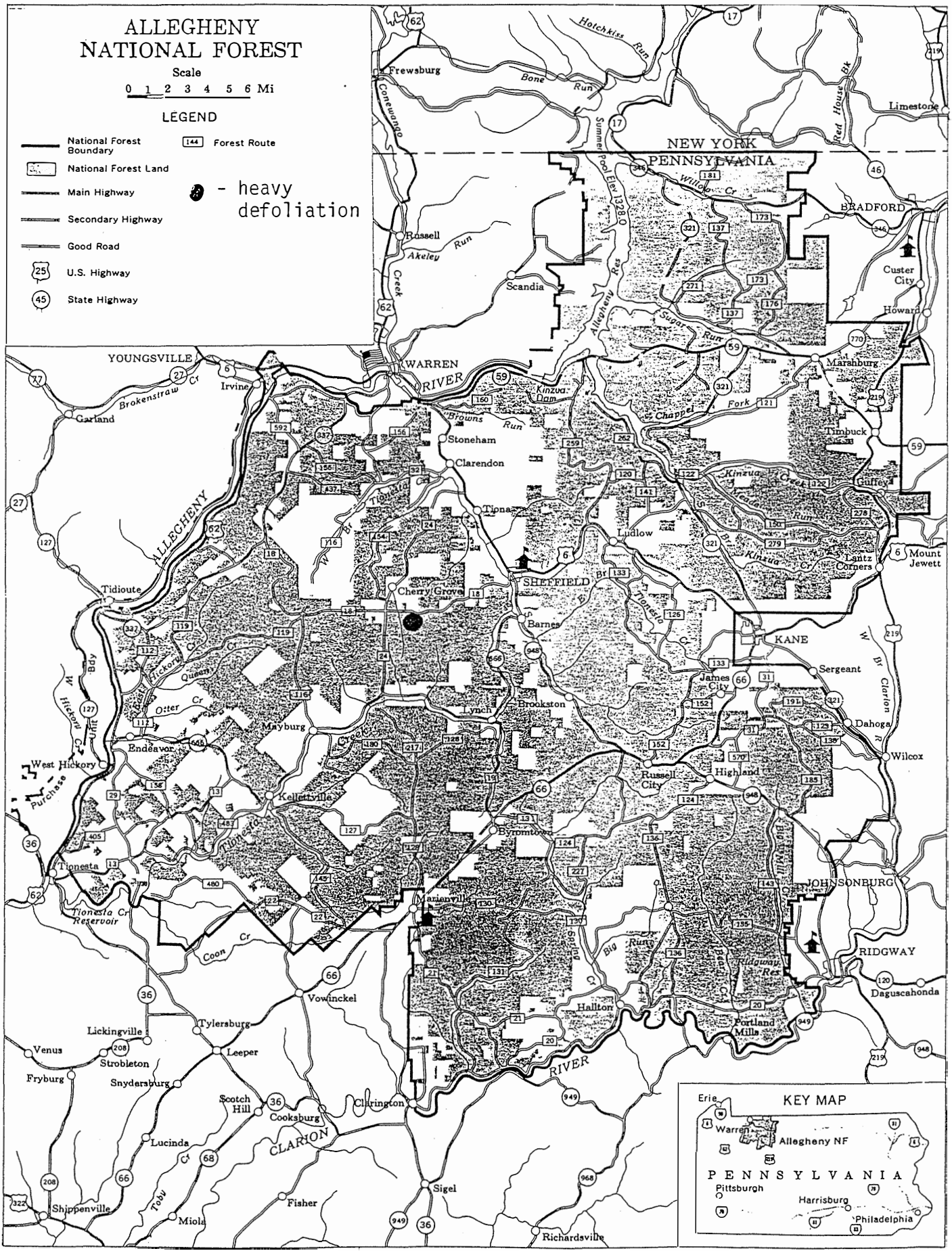
MAP 9 DEFOLIATION BY THE FALL CANKERWORM, 1966



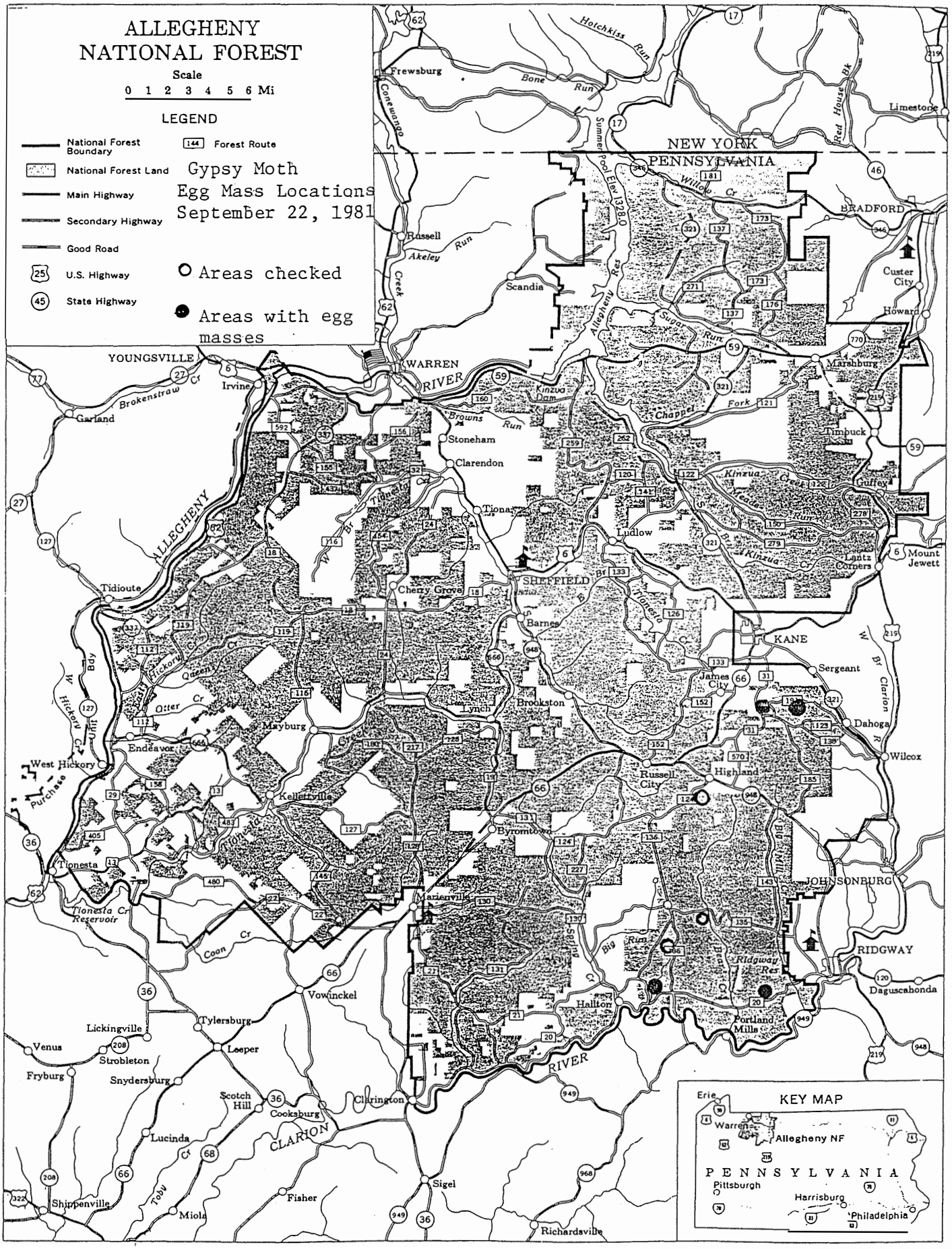
MAP 10 FALL CANKERWORM DEFOLIATION, FROM AERIAL SURVEY OF 1968



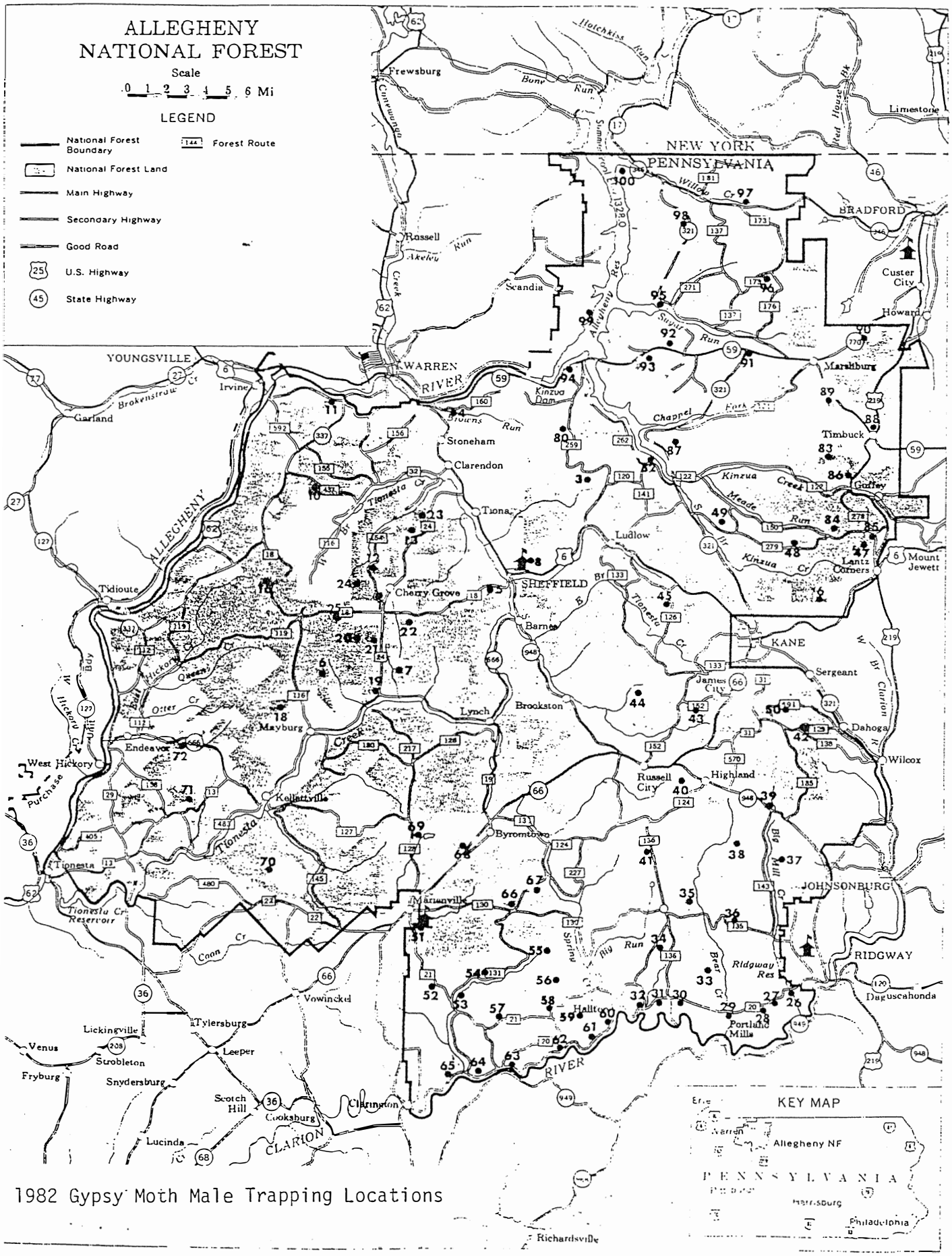
MAP 11 DEFOLIATION BY THE GREENSTRIPED MAPLE WORM, 1973



MAP 12


ALLEGHENY
NATIONAL FOREST
Scale
0 1 2 3 4 5 6 Mi
LEGEND
National Forest Boundary
National Forest Land
Main Highway
Secondary Highway
Good Road
U.S. Highway
State Highway
Forest Route
Gypsy Moth
Egg Mass Locations
September 22, 1981
Areas checked
Areas with egg masses
NEW YORK
PENNSYLVANIA
Frewsburg
Limestone
Russell
Scandia
BRADFORD
Custer City
Howard
Marshburg
YOUNGSVILLE
WARREN
Irvine
Garland
Stoneham
Clarendon
Timpuck
Guffey
Tiona
Ludlow
Mount Jewett
Lantz Corners
Tidioute
Cherry Grove
SHEFFIELD
Barnes
KANE
Sergeant
James City
Brookston
Lynch
Dahoga
Wilcox
Mayburg
Endeavor
West Hickory
Kellettville
Russell City
Highland
Byromtown
Tionesta
Marienville
JOHNSONBURG
RIDGWAY
Dagus cahonda
Tionesta Cr Reservoir
Vowinckel
Hallton
Portland Mills
Tylersburg
Lickingville
Venus
Strobleton
Leeper
Fryburg
Snydersburg
Scotch Hill
Cooksburg
Clarington
Lucinda
CLARION
Shippenville
Fisher
Sigel
Miola
Richardsville
KEY MAP
Erie
Warren
Allegheny NF
PENNSYLVANIA
Pittsburgh
Harrisburg
Philadelphia

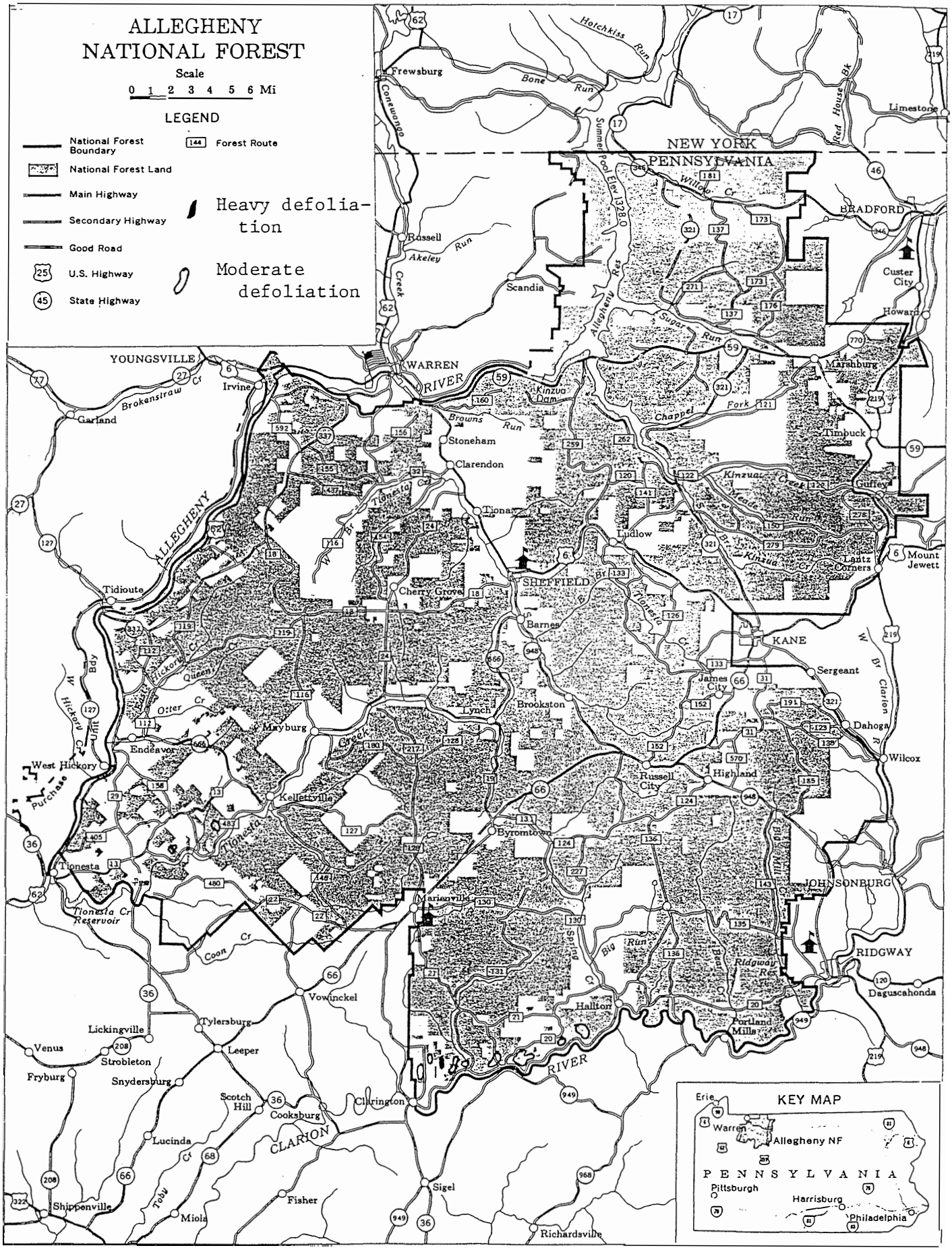
MAP 13



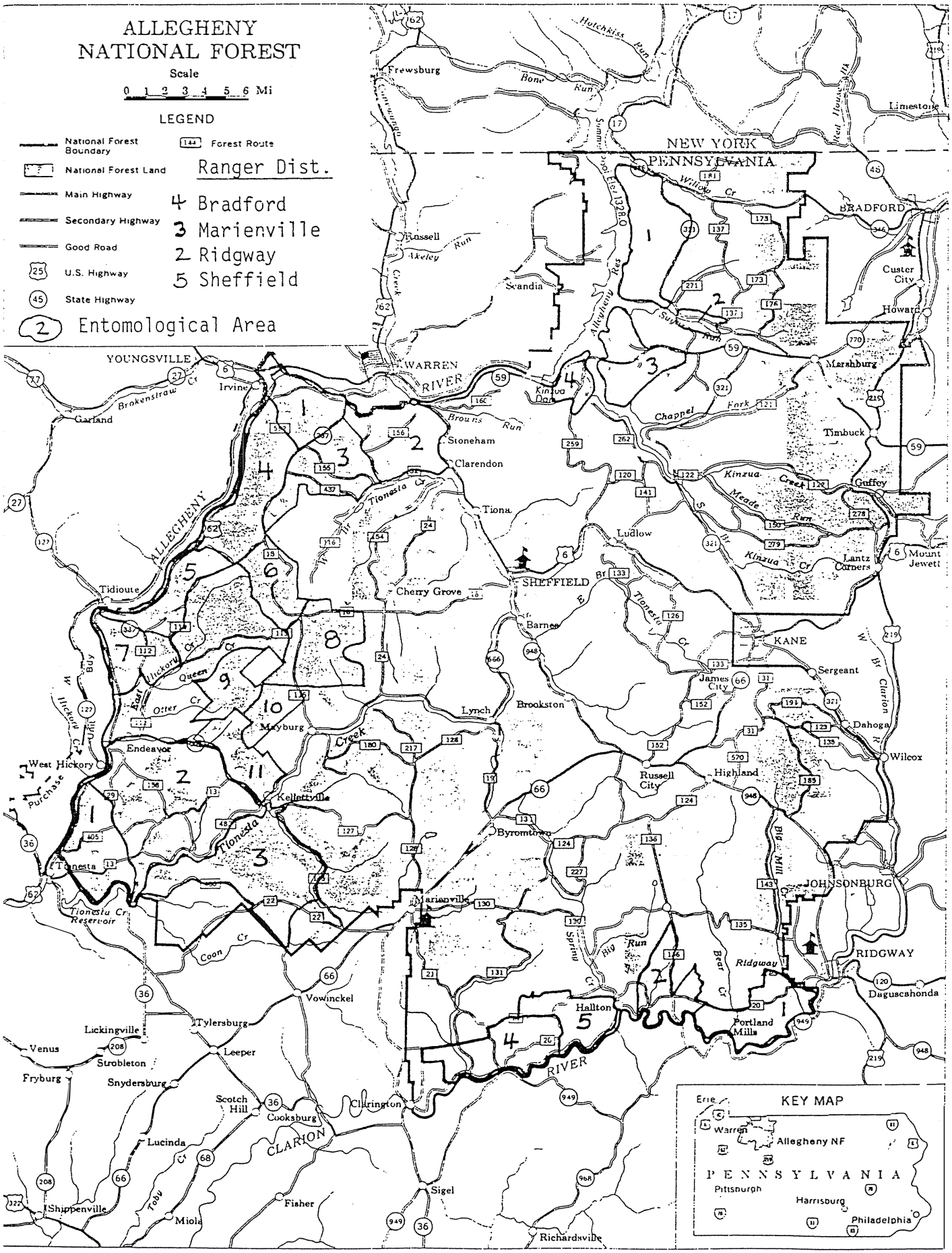
1982 Gypsy Moth Male Trapping Locations

MAP 14

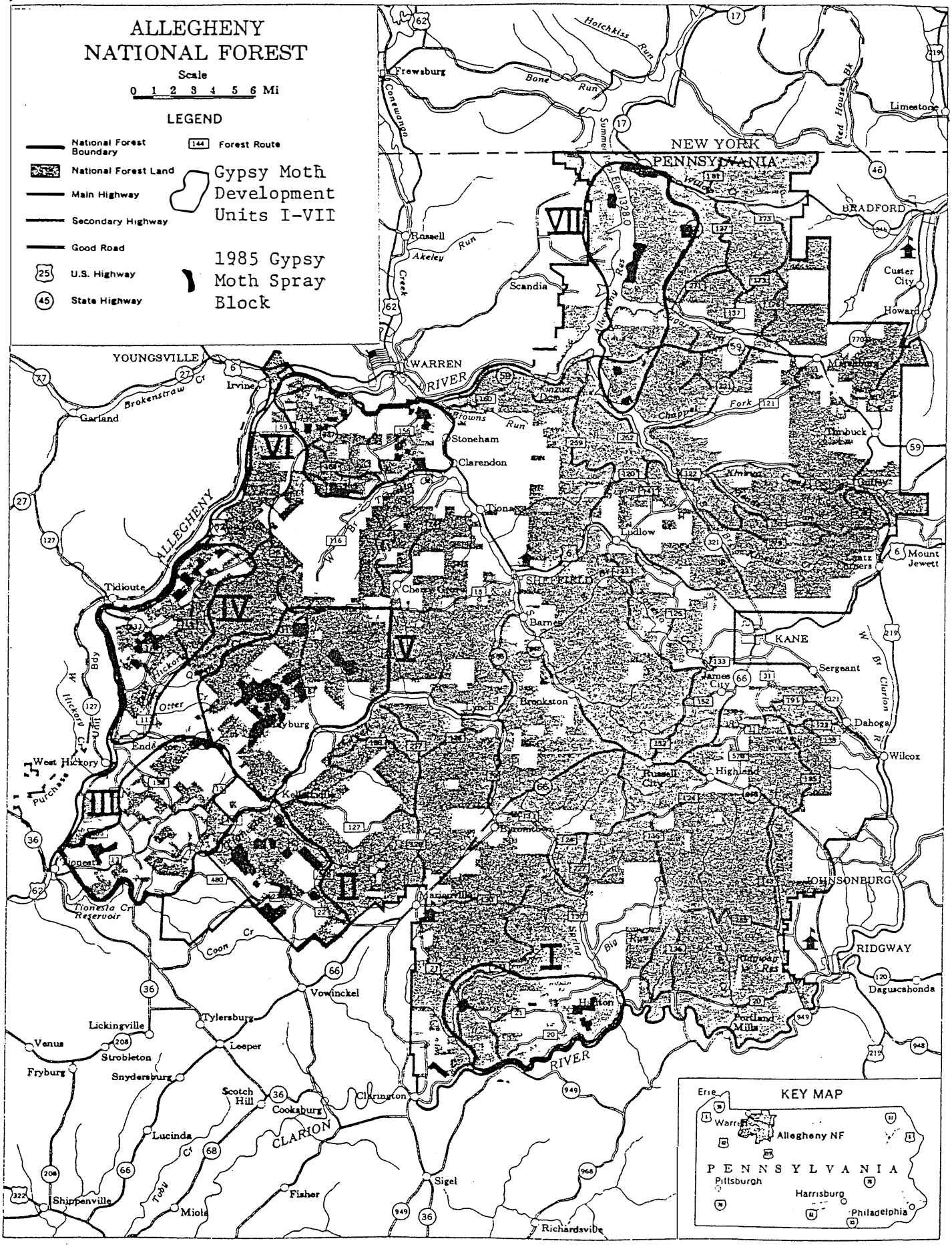
GYPSY MOTH DEFOLIATION, JULY 20, 1984



MAP 15 GYPSY MOTH ENTOMOLOGICAL AREAS, 1984

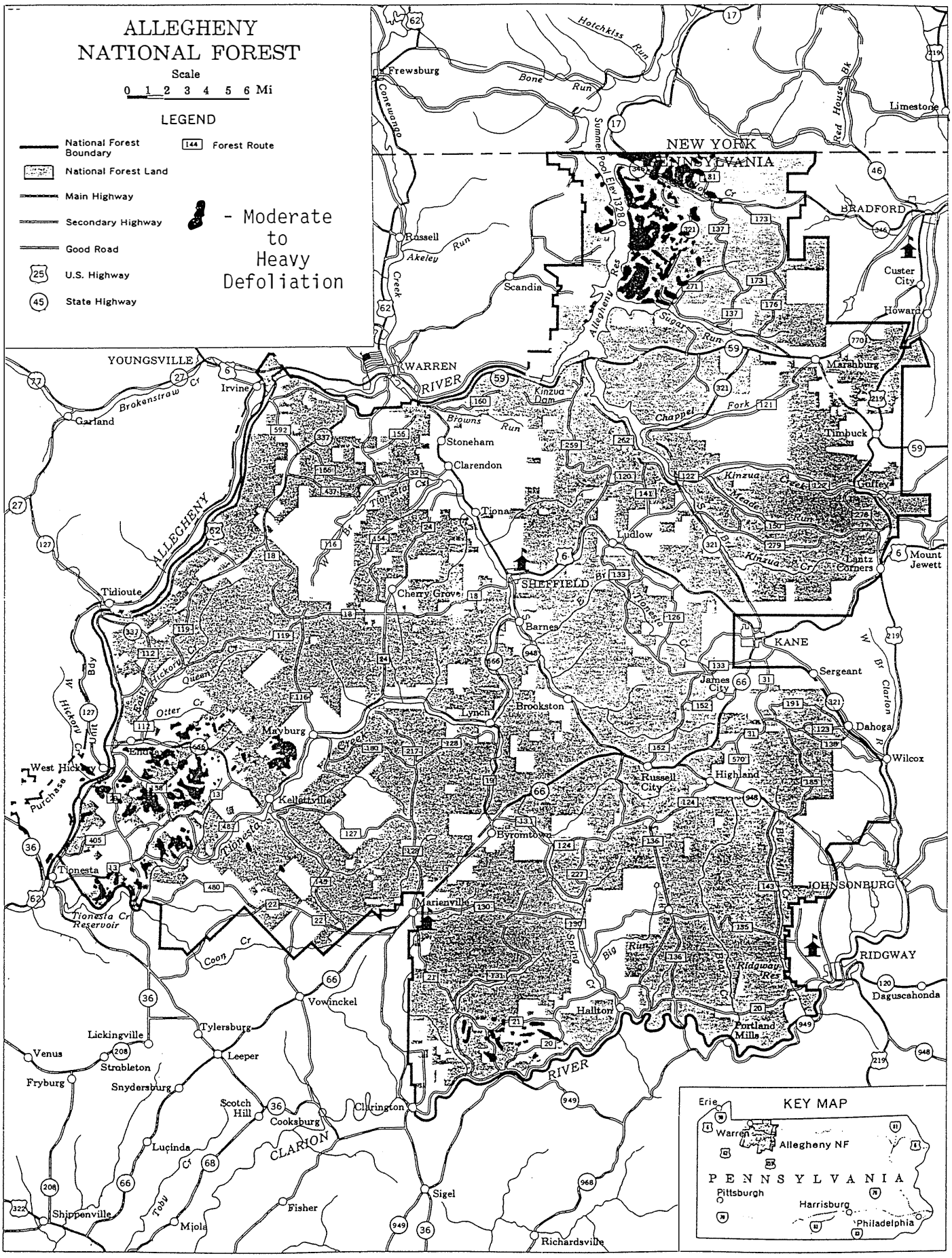


Map 16 Allegheny National Forest, 1985 Gypsy Moth Suppression Project

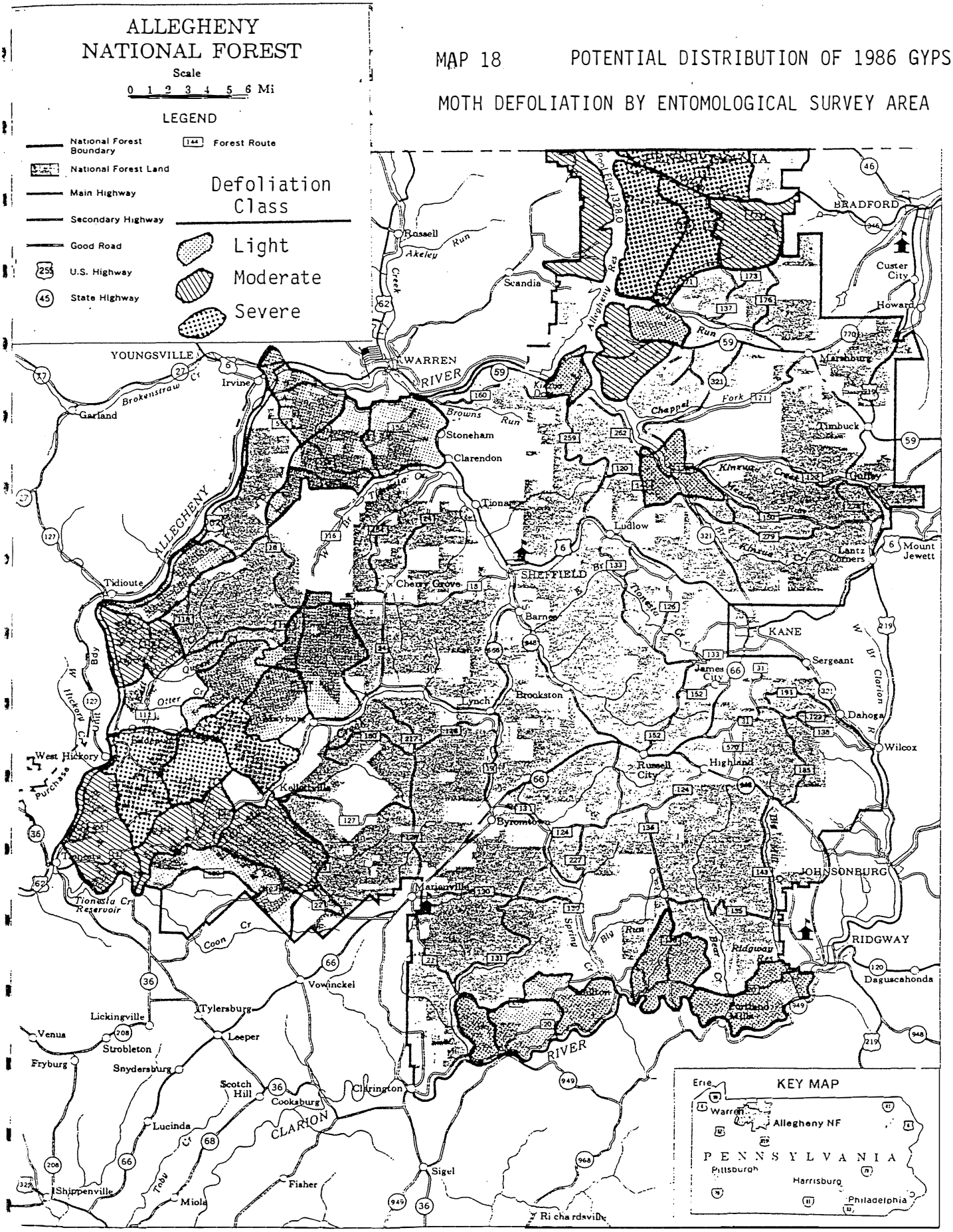


MAP 17

1985 GYPSY MOTH DEFOLIATION



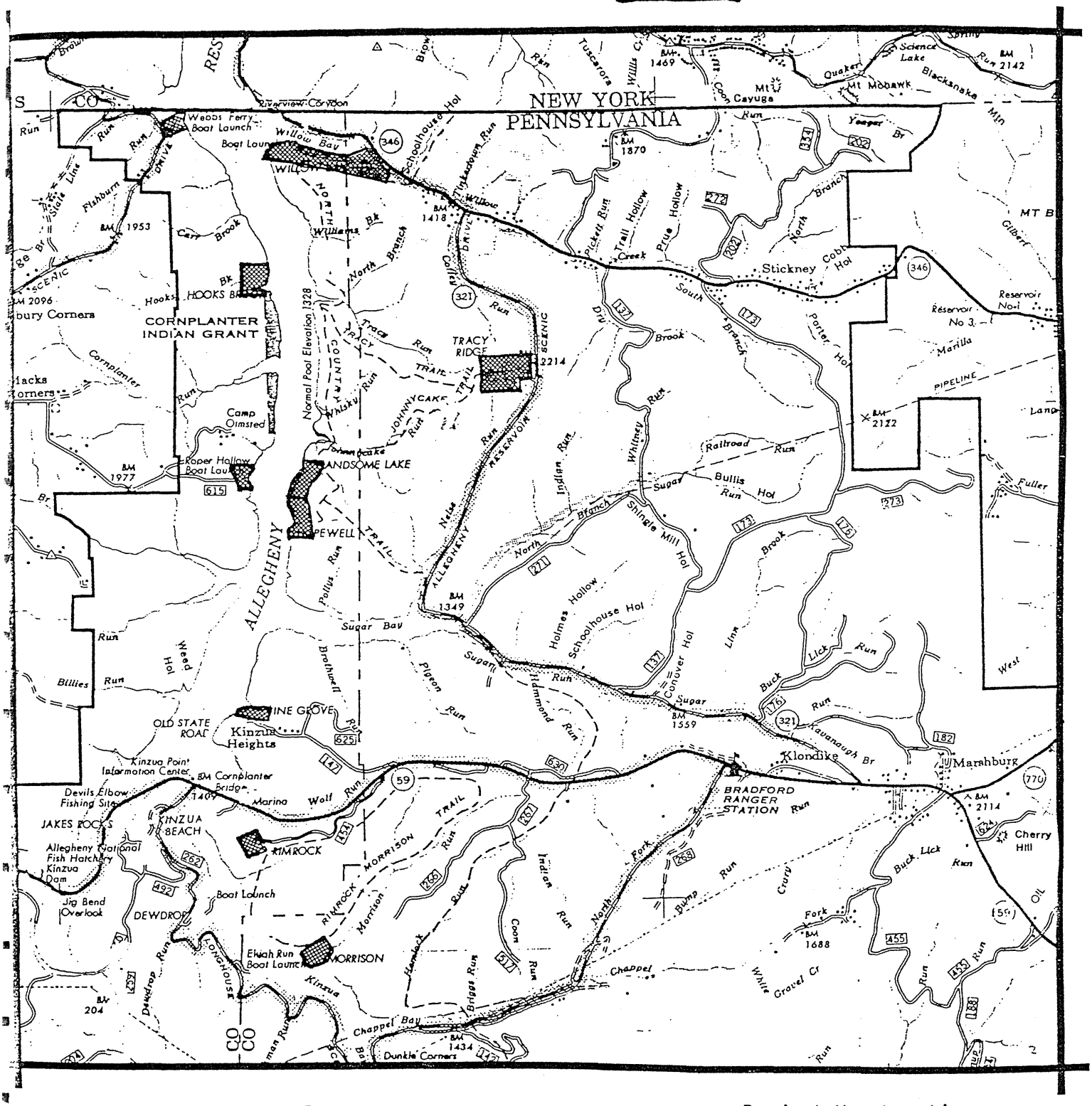
MAP 18 POTENTIAL DISTRIBUTION OF 1986 GYPSY MOTH DEFOLIATION BY ENTOMOLOGICAL SURVEY AREA



MAP 19 - ALLEGHENY NATIONAL FOREST - Bradford Ranger District

1986 Proposed Gypsy Moth Suppression Project - Alternative 2

B.t. at Developed Recreation Sites

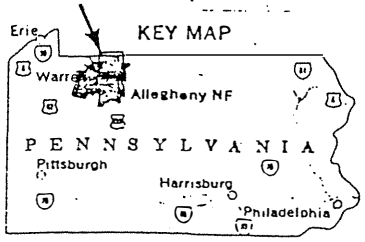


National Forest Boundary ——————

State Highway (34)

Forest Route [23]

Project Map Location

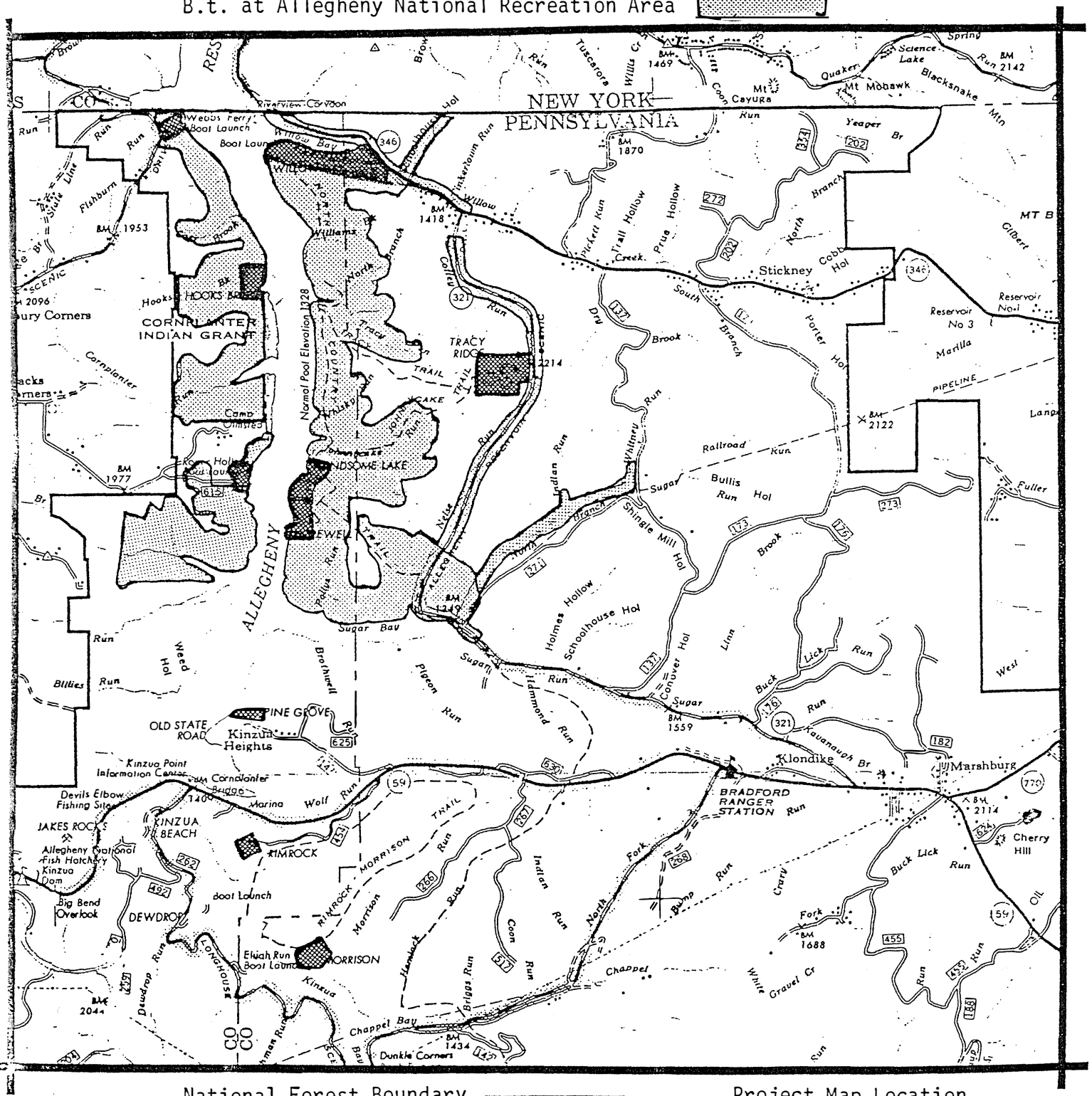


MAP 20- ALLEGHENY NATIONAL FOREST - Bradford Ranger District

1986 Proposed Gypsy Moth Suppression Project - Alternative 3

B.t. at Developed Recreation Sites

B.t. at Allegheny National Recreation Area



National Forest Boundary ——————

State Highway (21)

Forest Route [34]

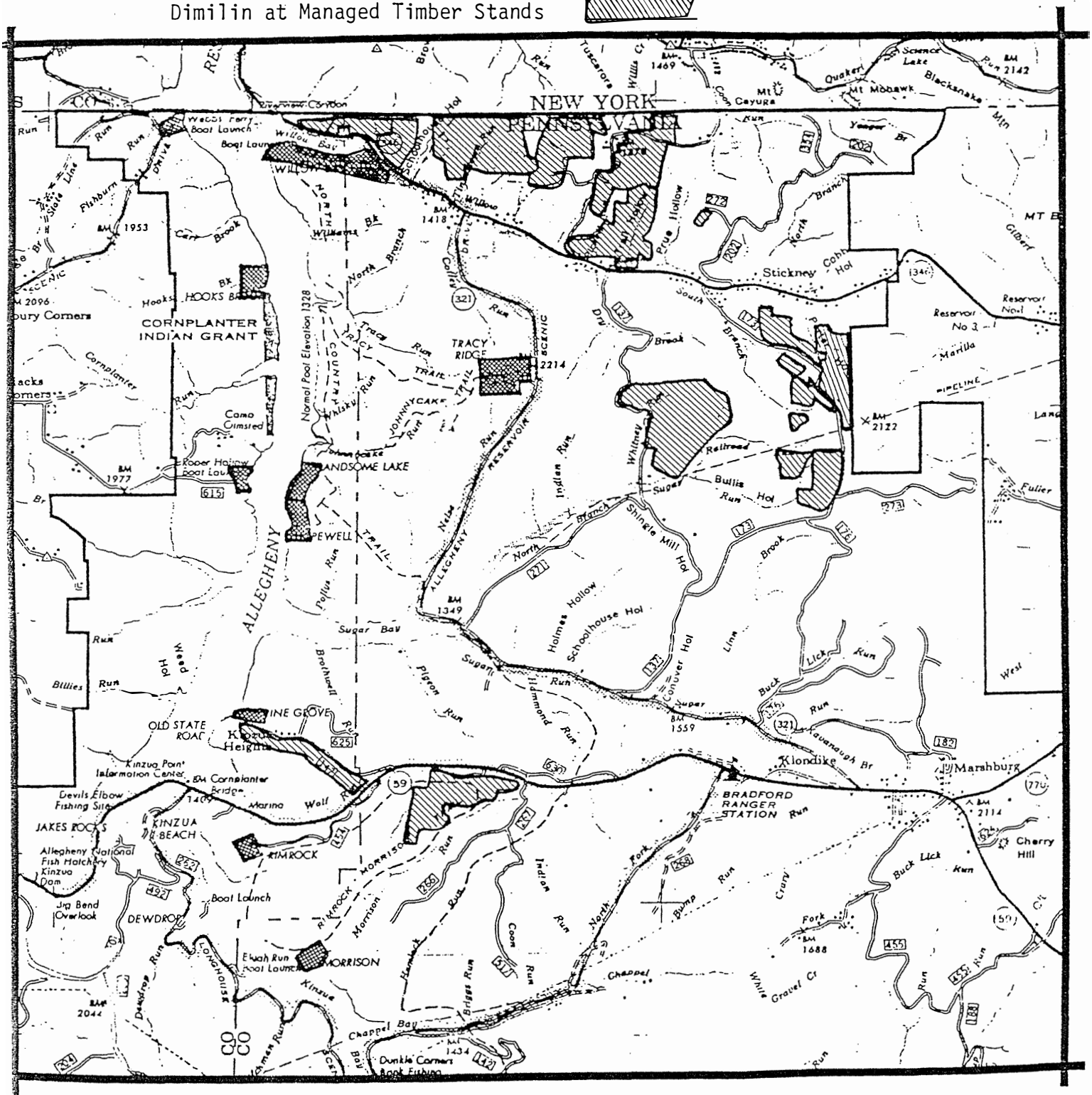
Project Map Location

MAP 21 - ALLEGHENY NATIONAL FOREST - Bradford Ranger District

1986 Proposed Gypsy Moth Suppression Project - Alternative 4

B.t. at Developed Recreation Sites

Dimilin at Managed Timber Stands



National Forest Boundary ——————

State Highway (33)

Forest Route [24]

Project Map Location

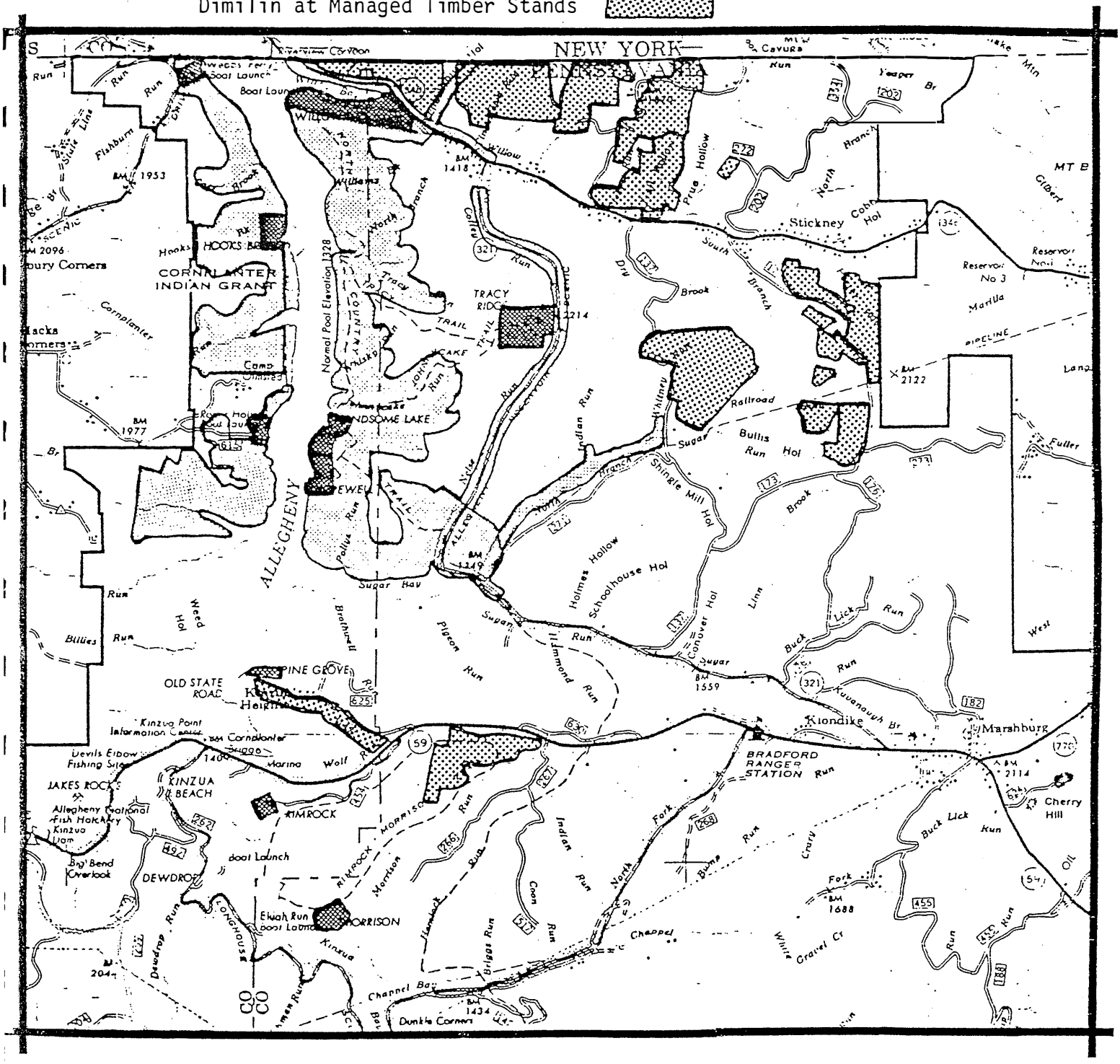
MAP 22 - ALLEGHENY NATIONAL FOREST - Bradford Ranger District

1986 Proposed Gypsy Moth Suppression Project - Alternatives 5 & 6

B.t. at Developed Recreation Sites

B.t. at Allegheny National Recreation Area

Dimilin at Managed Timber Stands

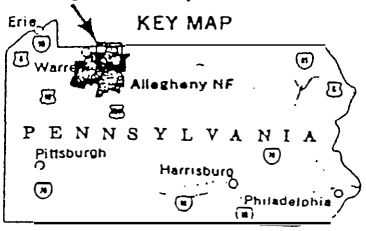


National Forest Boundary ——————

State Highway (32)

Forest Route [28]

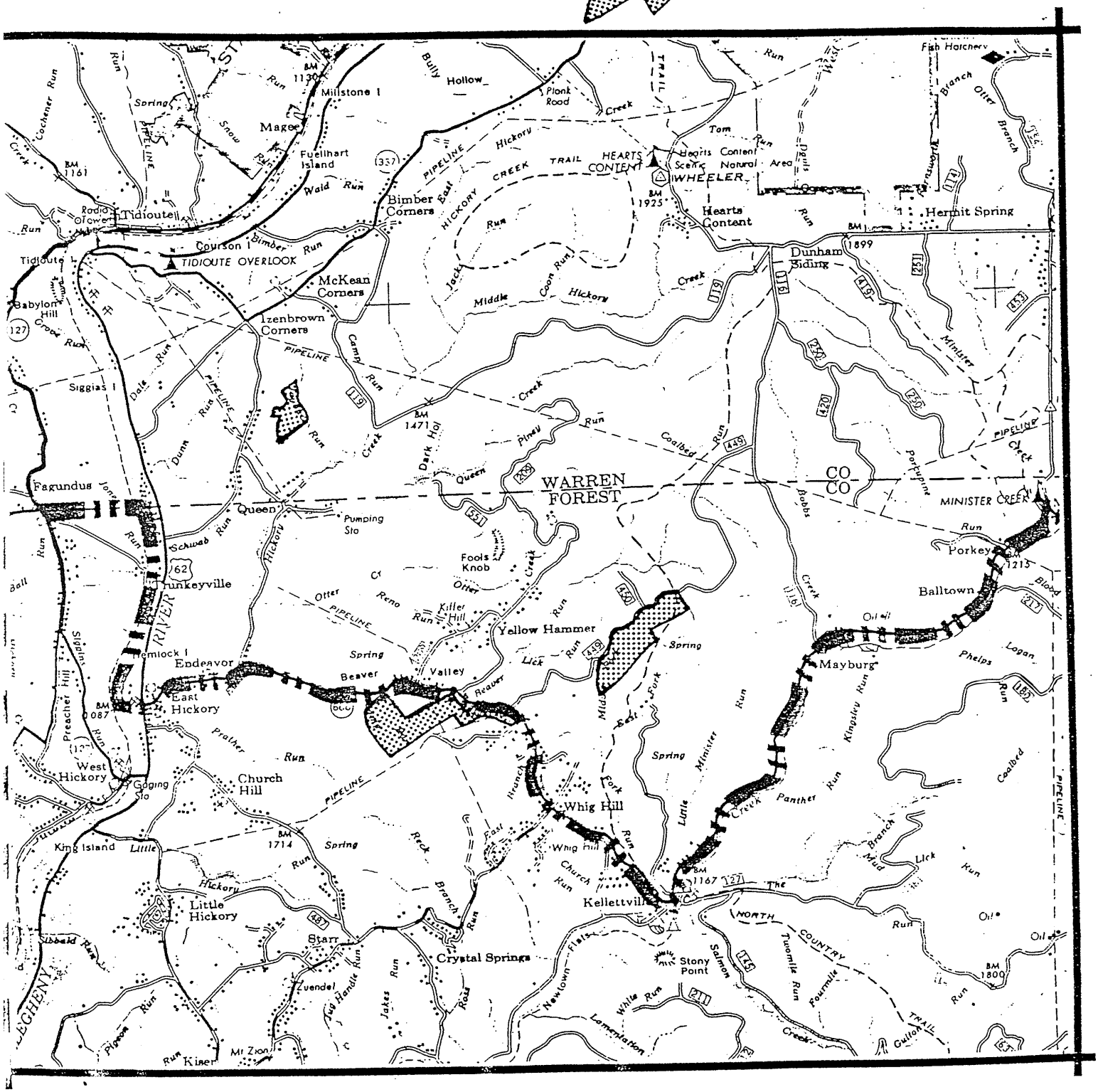
Project Map Location



MAP 23 - ALLEGHENY NATIONAL FOREST - MARIENVILLE & SHEFFIELD RDs

1986 Proposed Gypsy Moth Suppression Project - Alternatives 4, 5 & 6

Dimilin or B.t. at Managed Timber Stands



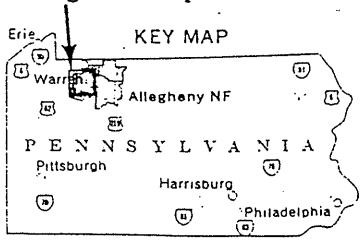
National Forest Boundary

Ranger District Boundary

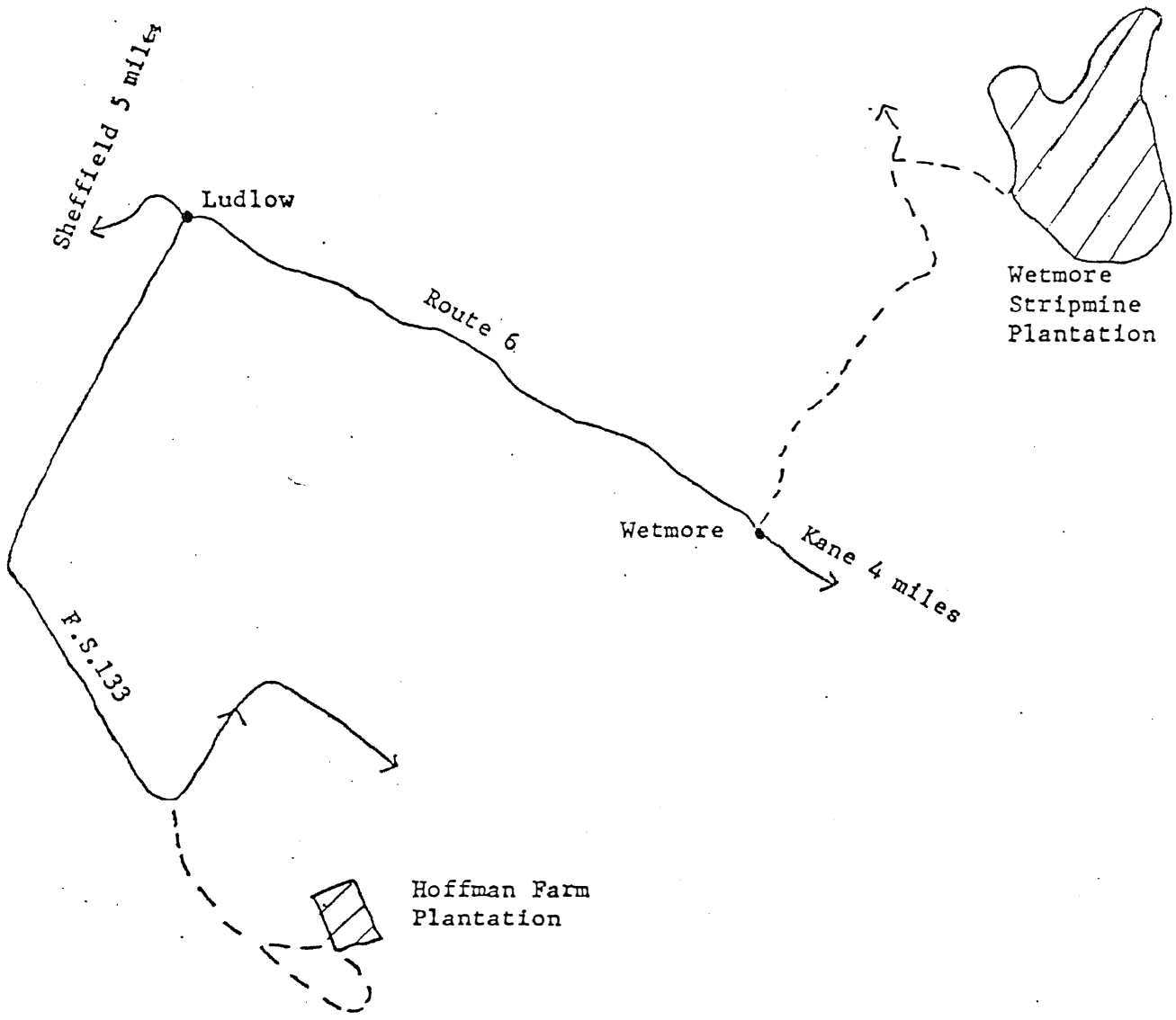
State Highway (31)

Forest Route [29]

Project Map Location

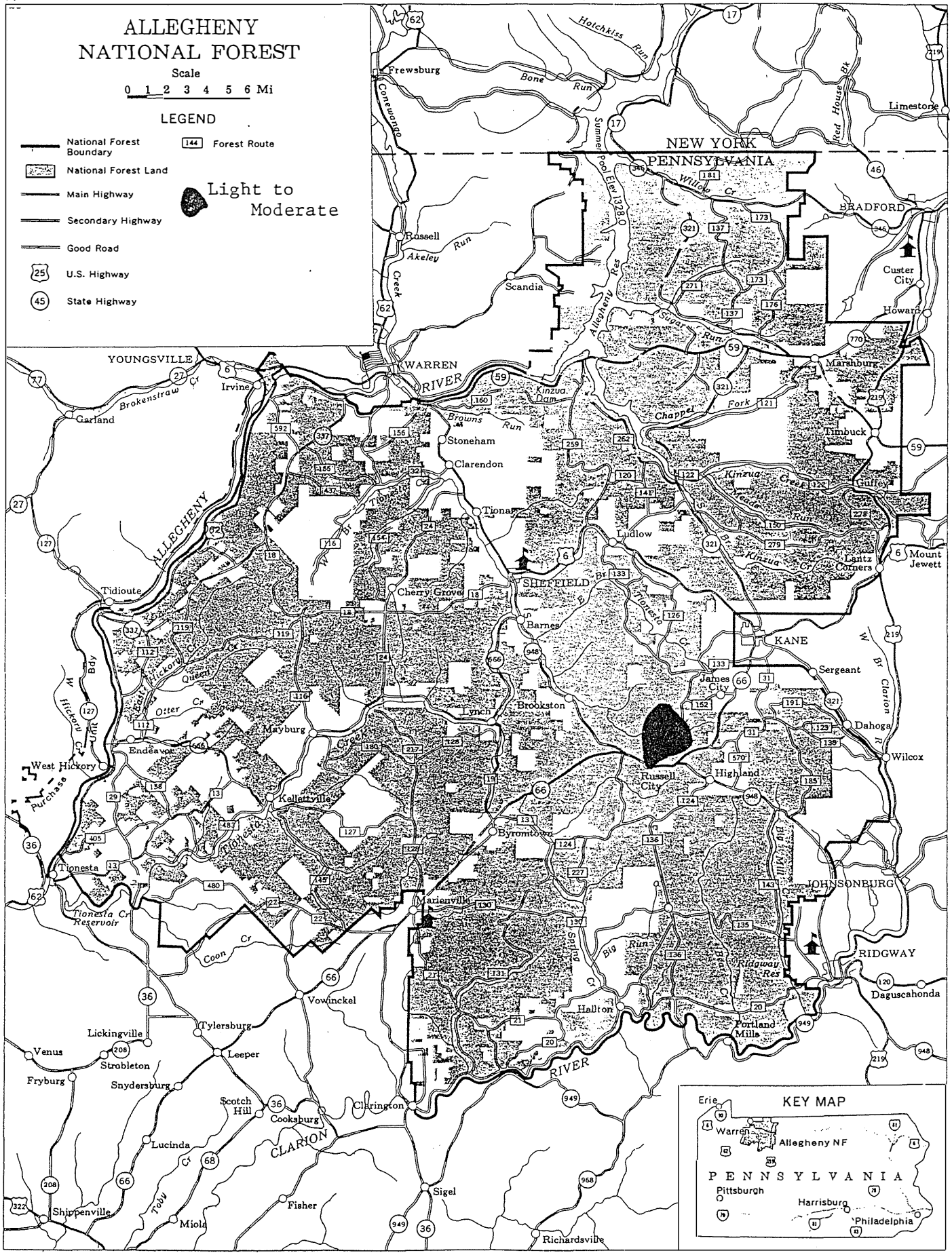


MAP 24 - LARCH PLANTATIONS SURVEYED FOR LARCH SAWFLY, 1966-67
RIDGWAY DISTRICT, ALLEGHENY NATIONAL FOREST

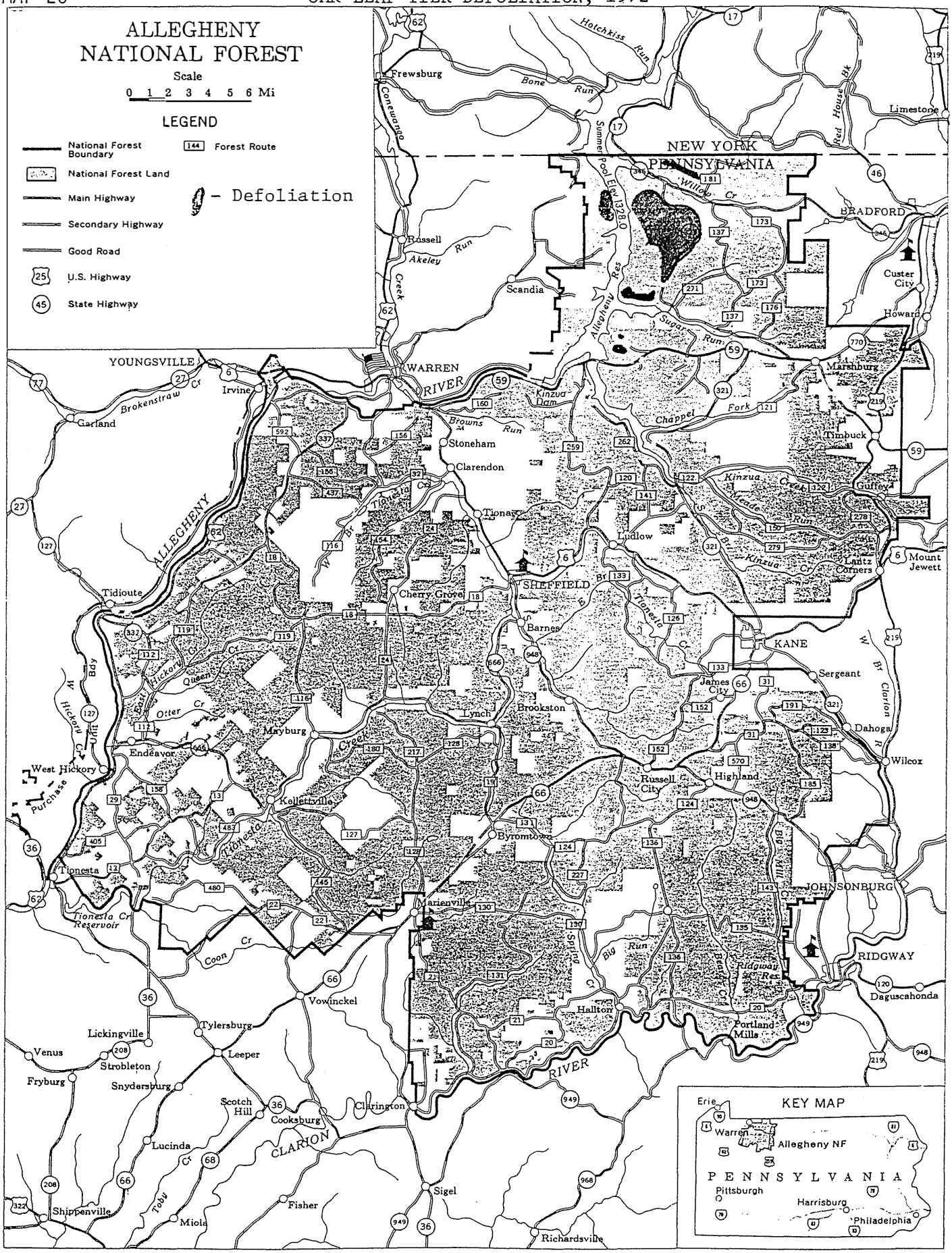


Larch Plantations

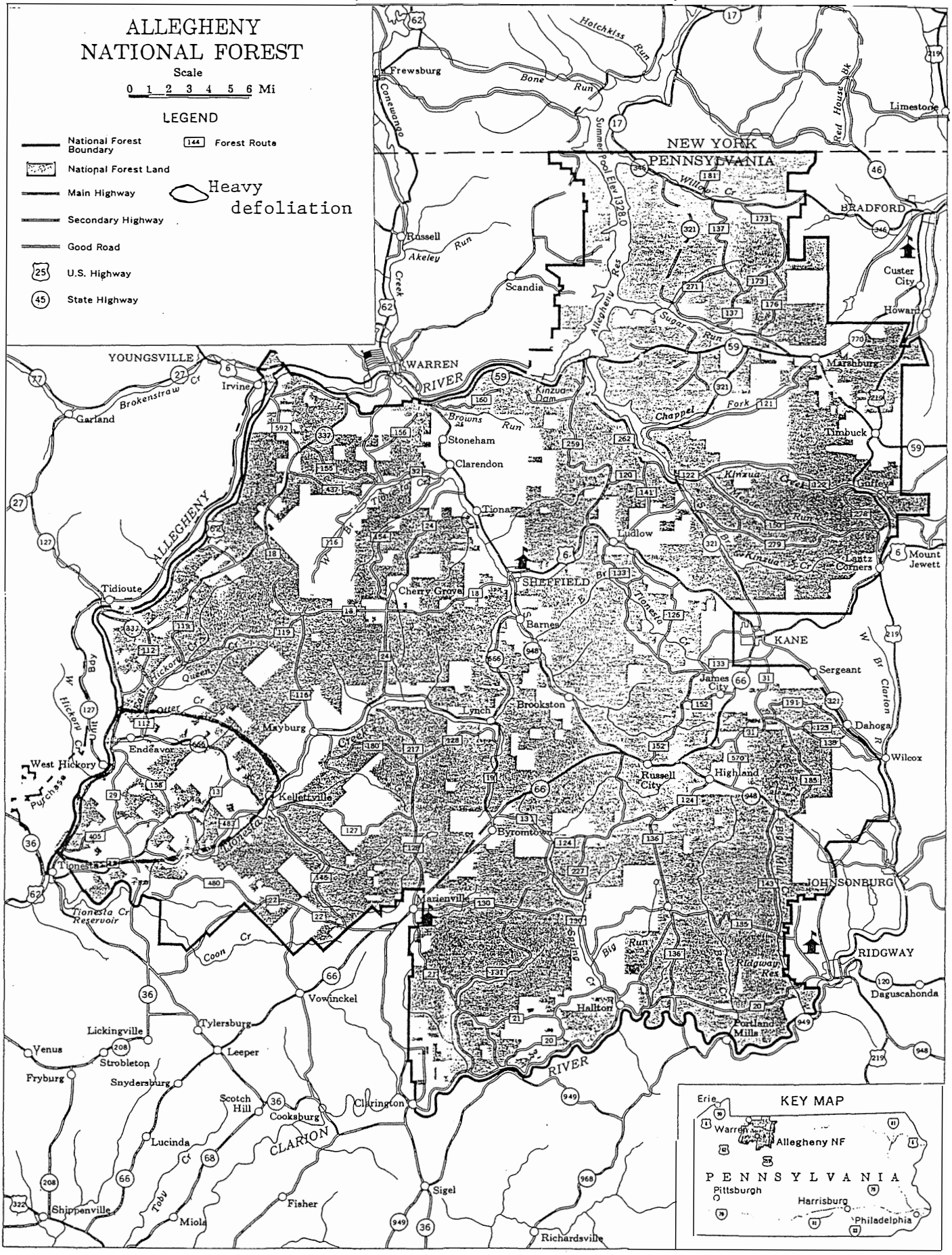
MAP 25 LINDEN LOOPER DEFOLIATION, 1967



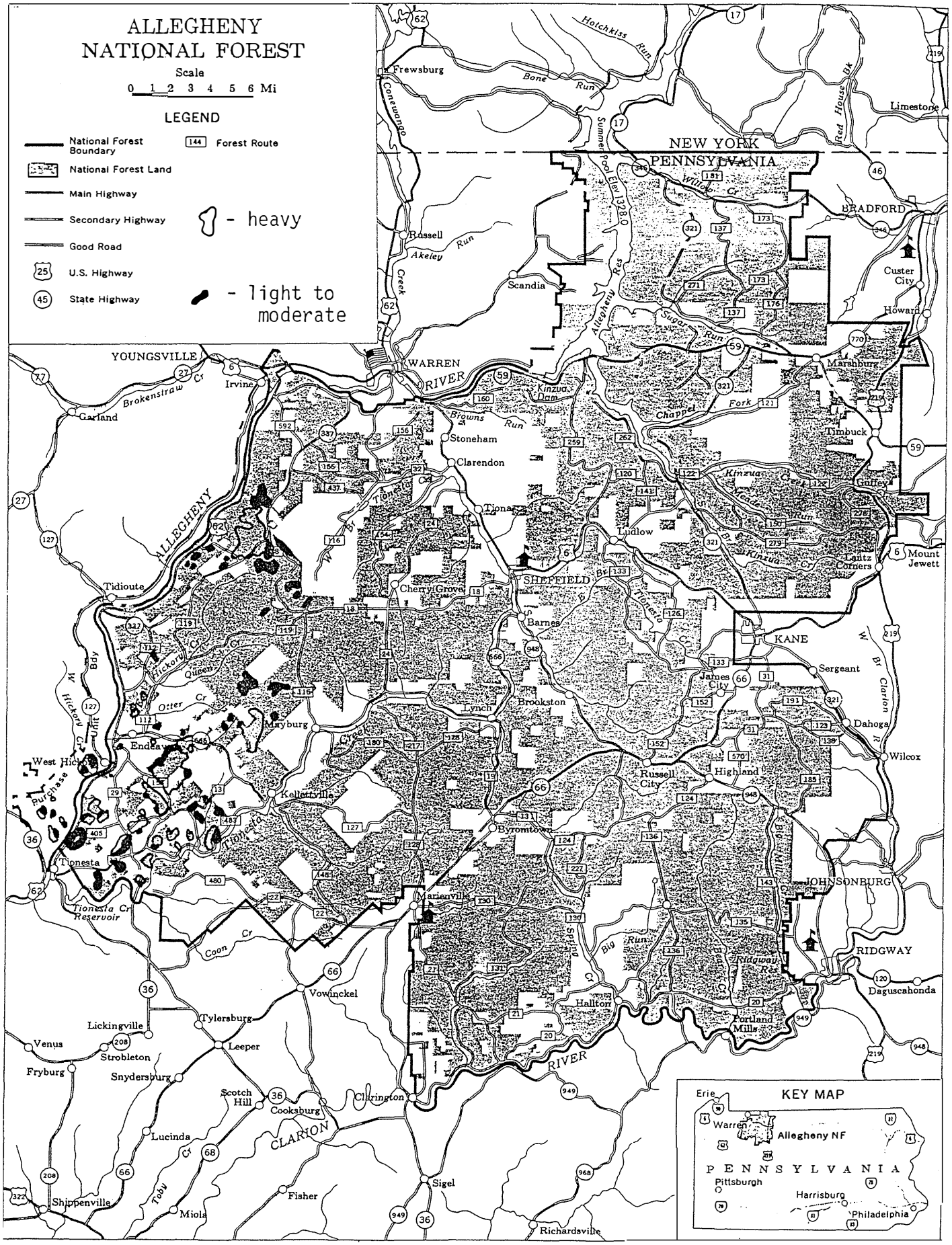
MAP 26 OAK LEAF TIER DEFOLIATION, 1972



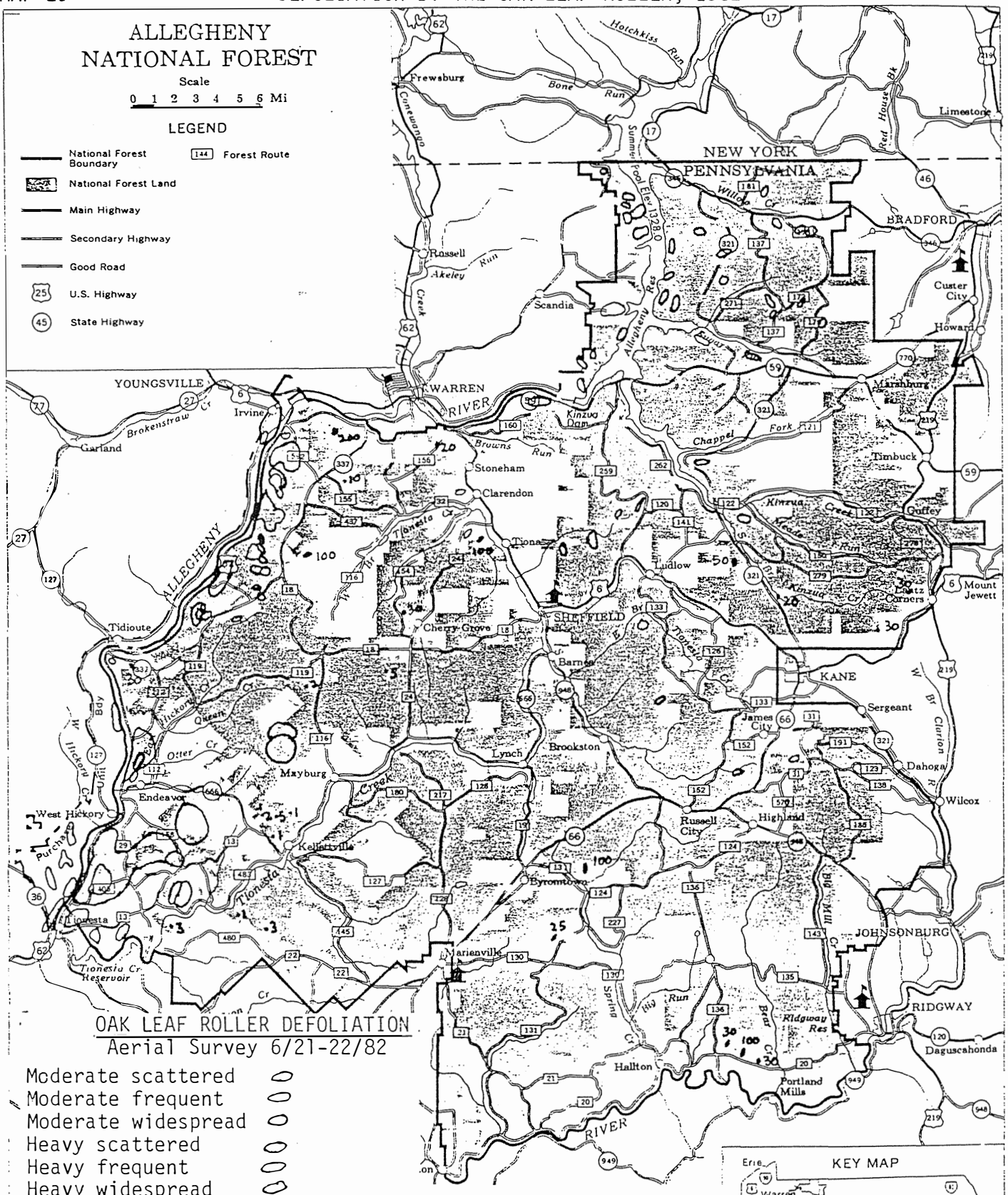
MAP 27 OAK LEAF TIER, OAK LEAF ROLLER DEFOLIATION, 1973



MAP 28 OAK LEAF ROLLER, OAK LEAF TIER DEFOLIATION, 1974



MAP 29 DEFOLIATION BY THE OAK LEAF ROLLER, 1982



OAK LEAF ROLLER DEFOLIATION
Aerial Survey 6/21-22/82

Moderate scattered	0
Moderate frequent	0
Moderate widespread	0
Heavy scattered	0
Heavy frequent	0
Heavy widespread	0

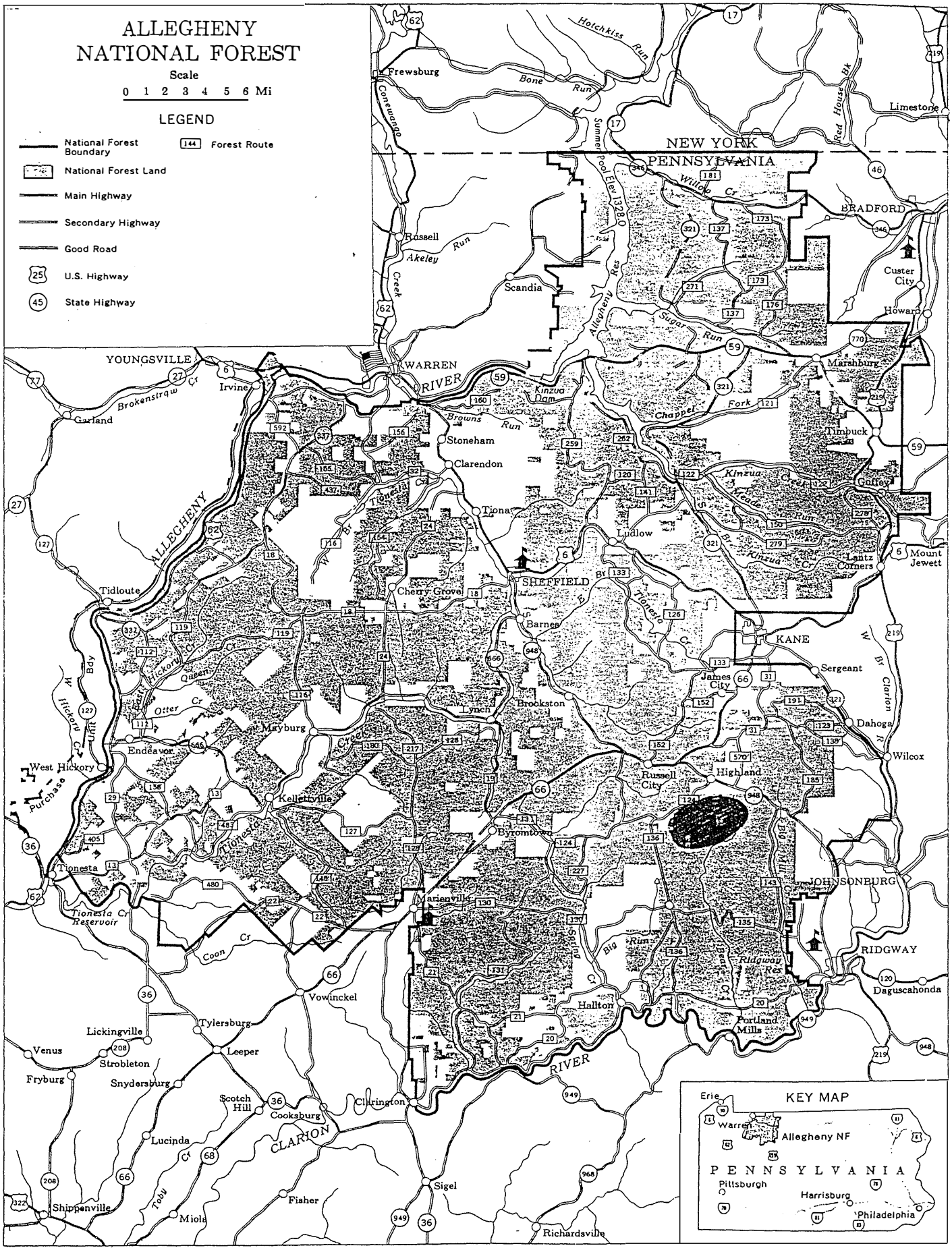
Approximate defoliated acreage:

Moderate scattered	4200
Moderate frequent	1400
Moderate widespread	0
Heavy scattered	11120
Heavy frequent	4320
Heavy widespread	0
Total:	21,040

TREE MORTALITY

Hemlock/Spruce	·1 / ●30
White or Red Pine	·1 / ●30
Hardwood	·1 / ●30

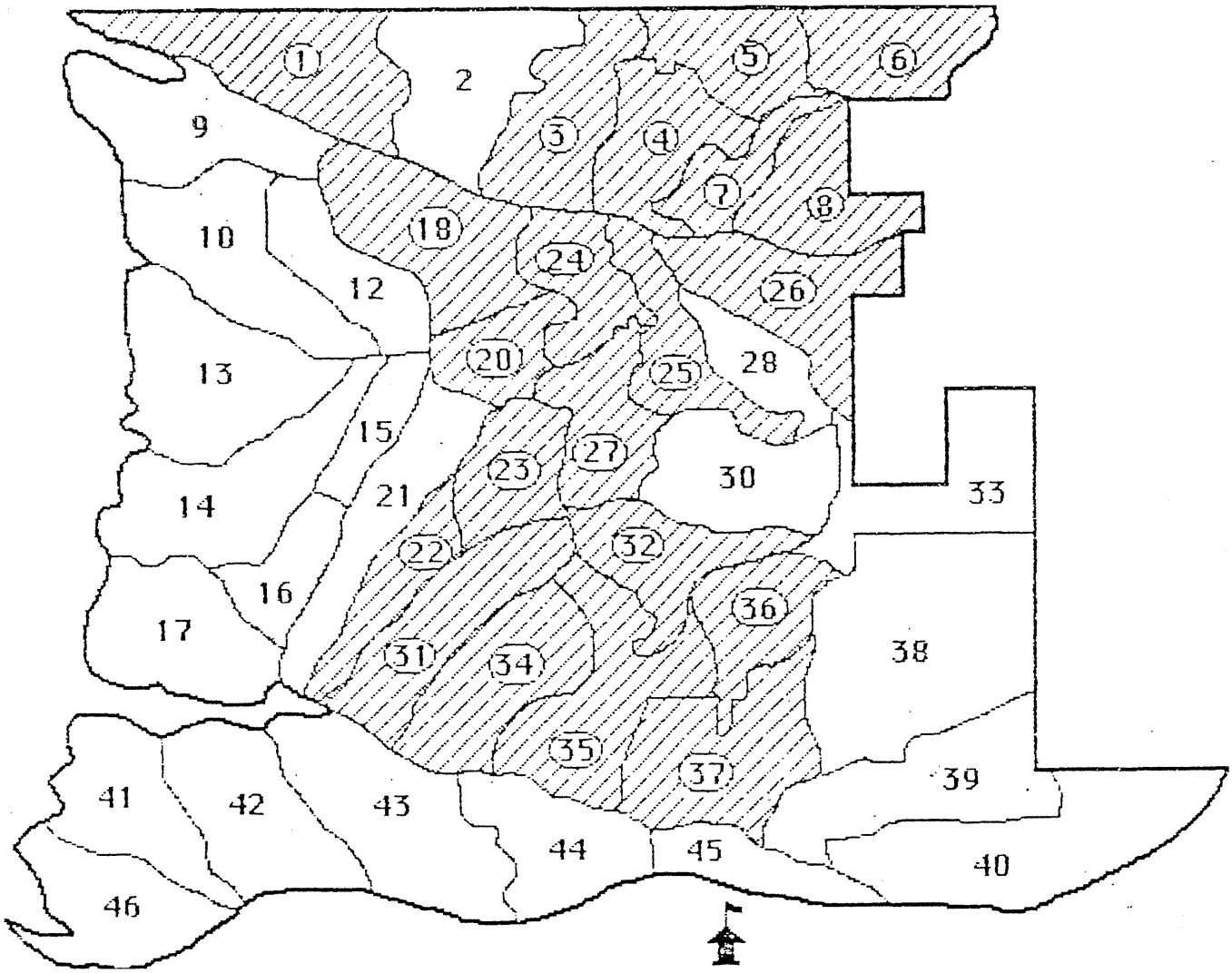
MAP 30 DEFOLIATION CAUSED BY THE SADDLED PROMINENT, 1971

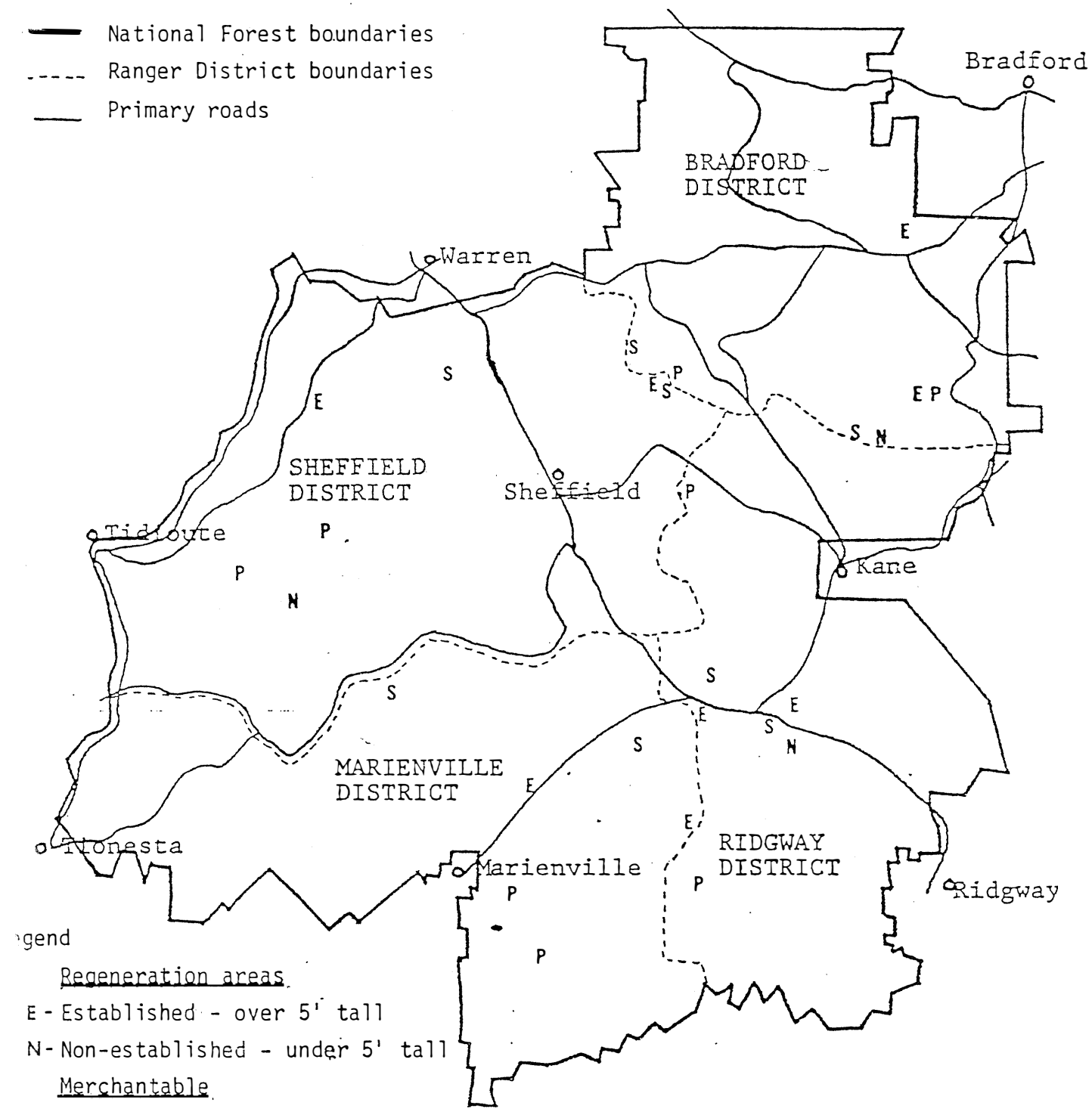


MAP 31

ALLEGHENY NATIONAL FOREST - BRADFORD RD

1985 BEECH BARK DISEASE DAMAGE EVALUATION





MAP 32 Location of regeneration and merchantable black cherry stands surveyed for black knot, Dibotryon morbosum, 1976.

MAP 33

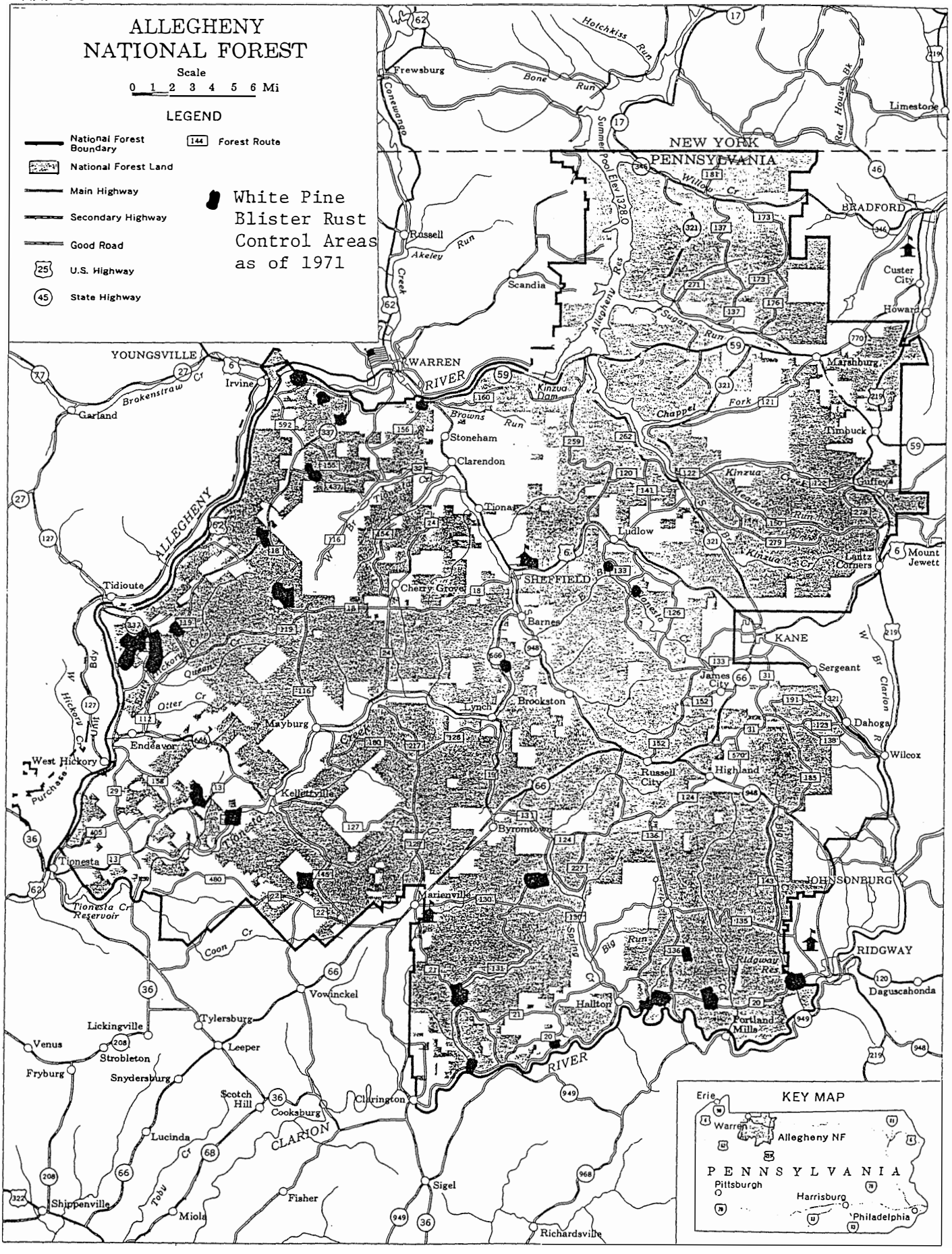

ALLEGHENY
NATIONAL FOREST
Scale
0 1 2 3 4 5 6 Mi
LEGEND
National Forest Boundary
144 Forest Route
National Forest Land
Main Highway
Secondary Highway
Good Road
25 U.S. Highway
45 State Highway
White Pine Blister Rust Control Areas as of 1971
NEW YORK
PENNSYLVANIA
Frewsburg
Bone Run
Hotchkiss Run
Conewango Cr
Summer Pool Elev 1380
Red House Br
Limestone
Willow Cr
BRADFORD
Custer City
Howard
Russell
Akeley Run
Scandia
Allegheny Res
Sugar Run
Marshburg
YOUNGSVILLE
WARREN
Irvine
Garland
Brokenstraw Cr
ALLEGHENY RIVER
Kinzua Dam
Browns Run
Chappel Fork
Stoneham
Clarendon
Timbuck
Tionas
Ludlow
Kinzua Cr
Meade Run
Guffey
Lantz Corners
Mount Jewett
Tidioute
Cherry Grove
SHEFFIELD
Barnes
Tionesta Cr
KANE
Sergeant
James City
W Br Clarion R
Hickory Cr
Queen
Otter Cr
Mayburg
Lynch
Brookston
Dahoga
Endeavor
West Hickory
Wilcox
Russell City
Highland
Kellettville
Byromtown
Tionesta
Tionesta Cr Reservoir
Marienville
JOHNSONBURG
Coon Cr
Spring Run
Big Run
Ridgway Res
RIDGWAY
Dagus cahonda
Vowinckel
Hallton
Portland Mills
Lickingville
Tylersburg
Venus
Leeper
Strobleton
Fryburg
Snydersburg
Scotch Hill
Cooksburg
Clarington
CLARION RIVER
Lucinda
Tobu Cr
Shippenville
Miola
Fisher
Sigel
Richardsville
KEY MAP
Erie
Warren
Allegheny NF
PENNSYLVANIA
Pittsburgh
Harrisburg
Philadelphia

TABLE 1
1982 GYPSY MOTH MALE TRAPPING RESULTS

# Trap		# Moths
1		970
2		84
3		267
4		-
5	S	746
6		758
7	H	713
8		218
9	E	Missing
10		481
11	F	93
12		408
13	F	334
14		Missing
15	I	Missing
16		448
17	E	Missing
18		894
19	L	426
20		223
21	D	674
22		542
23		750
24		535
25		417
26		814
27		259
28		487
29		389
30		420
31		585
32	R	537
33		659
34	I	679
35		572
36	D	Missing
37		1,068
38	G	248
39		511
40	W	586
41		Missing
42	A	486
43		81
44	Y	90*
45		172
46		1,368
47		842
48		319
49		418
50		209
Sample Trap		378

# Trap		# Moths
51		831
52		1.019
53	M	583
54		697
55	A	843
56		408
57	R	767
58		138
59	I	427
60		607
61	E	587
62		541
63	N	989
64		433
65	V	424
66		710
67	I	385
68		207
69	L	98
70		558
71	L	301
72		558
73	E	201
74		Missing
75		Missing
Sample Trap		346
76		Missing
77		Missing
78		Missing
79		Missing
80		877
81	B	Missing
82		316
83	R	1,054
84		1,483
85	A	1,408
86		1,437
87	D	540
88		424
89	F	1,363
90		79
91	O	517
92		72
93	R	463
94		172
95	D	678
96		257
97		0
98		681
99		32
100		593

TABLE 2.--Allegheny National Forest Gypsy Moth Biological Evaluation - 107,273 Acres (1984)

RD	Entomol. Area	Acres	No. of Plots	1985 Defoliation Class - %		
				Light	Moderate	Severe
Bradford	1-Tracy Ridge	9,188	28	25	54	21
	2-Sugar Run	1.071	6	100	0	0
	3-Rimrock	6,335	28	57	43	0
	4-Jakes Rocks	2,545	15	100	0	0
TOTAL		19,139				
Marienville	1-Tionesta	3,946	15	40	40	20
	2-Hickory	7,928	15	33	47	20
	3-Guiteaville	7,440	15	53	40	7
	4-Millstone	2,595	15	13	47	40
	5-Painter Run	3,772	15	80	20	0
TOTAL		25,681				
Ridgway	1-Bear Creek	6,172	15	93	7	0
	2-Beuhler Corner	5,580	15	93	7	0
TOTAL		11,752				
Sheffield	1-Grunderville	4,239	15	67	33	0
	2-Clarendon	4,543	15	93	7	0
	3-Chapman	5,787	15	60	33	7
	4-Allegheny Front	7,790	16	88	13	0
	5-Bimber/McKean	4,028	16	56	38	6
	6-Sandstone Spgs.	4,093	15	73	27	0
	7-Red House/ Kelly Hill	3,198	15	80	20	0
	8-Dunham Siding	7,236	15	87	13	0
	9-Yellow Hammer	2,813	15	53	40	7
	10-Beaver Run	3,283	15	7	73	20
	11-Kellettville	3,691	15	13	0	87
TOTAL		50,701				

TABLE 3.--1984 Allegheny National Forest Gypsy Moth Biological Evaluation - Developed Recreational Sites

RD	Dev. Recr. Site	No. of Plots	Avg. EM/A	1985 %	Defoliation Class
Bradford	Handsome Lake	9	1018	44	M
	Hopewell	3	1600	68	S
	Willow Bay	9	837	35	M
	Tracy Ridge	7	1208	50	M
	Rimrock	4	916	39	M
	Pine Grove	3	227	16	L
	Morrison	6	711	30	M
	Kinzua Beach/Wolf Run	3	159	15	L
	Jakes Rocks	7	129	15	L
	Dewdrop	8	79	14	L
	Hooks Brook	6	856	36	M
	Roper Hollow	6	629	27	L
	Kiasutha	7	267	17	L
	Red Bridge	6	316	19	L
Marienville	Loleta	5	389	20	L
	Beaver Meadow	7	208	15	L
Sheffield	Buckaloons	5	122	15	L
	Hearts Content	4	261	16	L

TABLE 4

1985 Gypsy Moth Defoliation on the Allegheny National Forest

Ranger District	Moderate (30-60%) (acres)	Severe (>60%) (acres)	Total (acres)
Bradford	3,259	1,540	4,799
Marienville	2,598	1,402	4,000
Sheffield	794	49	843
TOTAL	6,900	2,742	9,642

SUPPRESSION PROJECT DEFOLIATION - Defoliation was observed only in the following B.t. blocks:

Spray Blocks	Acreage	Defoliated Portion Acres (%)
Willow Bay	236	11 (5%)
Hook's Brook	100	2 (2%)
Tracy Ridge	1,238	7 (0.5%)
Handsome Lake & Hopewell	1,309	1 (0.08%)

District	Compartment/ Stand	Acreage	E/N[a]	# Seedlings	% Black Knot	% Black Knot on Main Stem[b]
Sheffield	89-1	14	N	138	26.8	-
	34-1	36	E	128	5.4	-
	28-1	13	E	23	13.0	-
Bradford	83-4	10	N	116	5.1	.8
	40-24	30	E	106	5.6	-
	64-11	22	E	122	4.0	1.6
Ridgway	74-1	17	N	41	-	-
	47-5	26	E	47	42.5	8.5
	50-2	38	E	119	5.0	0.8
Marienville	49-4	57	E	42	16.6	2.3
	109-22	10	E	40	15.0	2.5

a
E = Established
N = Not established

b
Knots noted on main stem were in such a position as to affect timber recovery

Table 6 Occurrence of black knot, Apiosporina morbosa on black cherry, Prunus serotina, in several regeneration areas on the Allegheny National Forest, 1975.

District	Compartment/ Stand	Acreage	Size	# Cherry/acre	% Black Knot	% Black Knot on stem
Sheffield	135-20	65	Pole	366	17.4 *	4.0
	76-4	63	Pole	90	10.0	0.3
	36-4	34	Saw	41	21.9	2.4
	19-7	14	Saw	14	-	-
Bradford	92-24	84	Pole	70	14.2	2.8
	82-16	20	Pole	140	23.5 *	6.4
	80-16	28	Saw	49	32.6 *	2.0
	88-6	53	Saw	70	20.0	-
Ridgway	23-22	42	Pole	22	4.5	-
	92-15	36	Pole	69	-	-
	63-5	25	Saw	109	2.7	-
	33-26	52	Saw	81	6.2	-
Marienville	70-34	18	Pole	71	-	-
	70-8	84	Pole	-	-	-
	36-15	38	Saw	67	8.9	-
	100-33	39	Saw	75	-	-

* Black knot recorded on both pole and sawtimber in the stands.

Table 5 Occurrence of black knot, Apiosporina morbosa on black cherry, Prunus serotina, in several merchantable stands on the Allegheny National Forest, 1975.